AN INTRODUCTION TO CLINICAL SURGERY

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Surgical Wherefores and Therefores

A REASONED EXPLANATION OF
SURGICAL NOTE TAKING

BY

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FOREWORD

This book embodies the substance of the tutorials which are given annually to the Surgical Dressers and which are based on my small book *Surgical Note taking*

Note taking is dealt with systematically in the present work and an attempt is made to explain as fully as possible the reasons and the justification for any question that may be asked At the same time the implications are indicated as well as those of anything that may be ascertained on examination

It is essentially clinical and in no way replaces a text book On the other hand it covers a great deal of ground and represents the results of many years of practical experience

One of its main objects is to avoid the parrot type of acquiring knowledge which is so well recognized that it has even attained the name of psittacism and to replace it by a knowledge based upon and the result of reasoned thinking The latter is the only knowledge of practical value as the parrot variety is difficult or impossible of application Besides parrot knowledge of any extent is limited to those with a good memory and is often fleeting while knowledge based on understanding can be attained by everyone with any common sense and will to work and is much more lasting and permanent

The character of the student and his early or late emergence from the cocoon of childhood are the chief factors in determining which type of knowledge he will set out to gain i e if he sets out at all

I wish to express my indebtedness and gratitude to members of the Cape Town Post Graduate Medical Association especially Drs H A Shapiro G Selzer C Cherry and E N Keen for their great and kind assistance in connection with the publication of the book

CHARLES F M SAINT

September 1945

FOREWORD TO THE SECOND EDITION

The most important change in this edition has been the introduction of numerous clinical photographs and diagrams to illustrate the text which has also been revised

C F M S

August, 1949

DEDICATED

TO MY STUDENTS

AND HOUSE SURGEONS

CONTENTS

SCHEME I

NOTE TAKING GENERAL SCHEME

The scheme here outlined is that in general use for note taking, and as such may be considered to represent the result of wide experience every point being of importance

The age sex race social condition and occupation may all have a direct bearing on the case and must therefore be noted

History

In taking the history covering as it does the present illness previous illnesses and any family affections while it may be necessary to give the patient some guidance undue influence must be studiously avoided from fear of confusing and so misleading him It must be remembered that most individuals are poor observers and in addition considerable difficulty may be experienced by them not only in interpreting any observation that is made but also in expressing such interpretation Tactful co-operation between the doctor and the patient is therefore essential if a true computation of the story is to be obtained Especially in the absence of symptoms which are the subjective evidence of trouble the individual may be unaware that there is anything wrong with him and it is well to keep in mind that many diseased conditions in their earliest and so most tractable stages give no indication of their presence Physical signs the objective evidence of abnormal conditions play a very much smaller part in attracting the patient s attention

The most important single symptom is pain and it is by far the most frequent complaint in bringing the patient to the doctor Apart from the varying intensity of it in different individuals under similar circum stances the different types of it under varying conditions of pathology may give the patient the utmost difficulty in describing it at all lucidly

Present Illness

The more complete the story in all its details particularly in chrono logical sequence the more likely is a correct interpretation and hence diagnosis to be made As the various diseases develop and their patho-logical changes evolve the clinical manifestations may vary or alter a great deal and consequently the better and truer the history the more readily can the vagaries be followed, and a correct assessment be arrived at particularly as to the stage of development

PREVIOUS ILLNESSES SIMILAR OR OTHER ILLNESSES

Similar illnesses are of importance since many diseases present recurrent attacks, due to the pathological changes which are likely to result *e g*, many infections remain permanently, though they may be temporarily quiescent, while, on the other hand, the development of fibrous tissue, so frequent a termination of inflammation or other cause of vascular interference is one of the most potent predisposing causes of further trouble The previous occurrence of other illnesses may also be of the utmost importance since either from a general or a local point of view, they may encourage the subsequent development of new diseases, *e g*, chronic bone disease may expose the patient by the undermining of his general constitution to any intercurrent disease, while old chronic syphilitic superficial glossitis is the commonest precursor of epithelioma of the tongue

FAMILY HISTORY

Similar or other diseased conditions in the family may have either a direct or indirect bearing on the patient s complaint e g tuberculosis though not an hereditary disease strongly suggests a predisposition while a disease like haemophilia carries with it definite hereditary characteristics A *family trait* like longevity *is also important to note* as it presents a very distinct hereditary tendency

PHYSICAL EXAMINATION

While the history comprises essentially hearsay evidence and mainly depends for its value on the patient the physical examination depends chiefly for its value on the doctor s acumen the patient still playing a prominent though varying part depending upon his reactions to the disease This examination calls for not only a thorough knowledge of disease and its pathology but also a comprehension of all that is included under human nature especially personality and character with its varying effects on disease and its manifestations

The physical examination is carried out by the aid of the senses information gained being assessed mainly by the all round so called Common Sense

It is customary to teach the use of the senses in the following order viz Inspection Palpation Percussion and Auscultation in other words Sight Touch* and Hearing while smell and taste are not mentioned

*The word touch is used clinically in a much wider and more comprehensive manner than in the more restricted one of purely tactile sense It includes somewhat loosely a variety of sensitivities which may be either subjective or objective or both and which are most conveniently embraced under the single term e g tactile sense pressure sense (consistency) temperature sense (heat and cold) muscle sense (weight resistance) and pain which is purely subjective

This serves to emphasize what is generally recognized in the human individual that the eyes are by far the most important, the hands next with the ears third Smell particularly should not be entirely excluded, as certain individuals are able to appreciate distinct odours for certain diseases and various exhalations or effluvia are only thus noted and they may be of considerable importance e g, acetone ammonia etc

The following chart is ordinarily used to indicate these points

THE SENSES

COMMON SENSE

SIGHT

TOUCH

HEARING

SMELL

TASTE

It is interesting to compare the relative value of the senses in animals other than humans, and it will be seen that they are commonly adapted to the environment Birds, so far as we know, depend almost entirely on sight, and as a demonstration of this nothing is more striking than the appearance of vultures at a kill, apparently from nowhere Flies and moths on the other hand appear to be greatly influenced by smell On the other hand, there can be no doubt of the special attraction blue flowers have for moths at night and this can only be explained by sight

In open country plains and deserts sight plays a very prominent part and it is the commonplace experience that the hunted animals always see the hunter before he sees them

In thick bush and forest however, sight plays a very inferior part smell now takes the lead and hearing becomes a poor second In the great majority of instances the animals get the scent of the hunter before he sees them and he is entertained to his annoyance by the noise of the stampede before he has been able to get into position for a shot However careful and quiet he may be on coming up with elephants, it is astonishing how frequently they are seen with their ears spread wide listening intently, though they are unable to see anything and smell nothing if he is approaching up wind

Downwind the attitude they present is with their trunks out and ranging over a varying area, perhaps through an arc of 30° in an attempt to get the scent This may be supported by the addition of the wide

spread ears It is sometimes claimed that, under favourable circumstances they may pick up a scent half a mile away

Dogs especially game dogs are an interesting demonstration They work entirely be scent and when tracking never raise their noses from the ground They arrive at the object without using their eyes at all

In the water conditions are grossly modified Hearing plays a definite part, though there is no external or middle ear and appreciation of sound seems to correspond to bone conduction as used in testing by the aurists It appears certain that sound will not penetrate the water from the outside and therefore fish will not register those noises which develop entirely outside the water they are in On the other hand judging by the great development of the olfactory apparatus this must play a most important part though apparently the fishes must be able to smell substances in watery solution while we can only do so in gaseous suspension The fishes however have a special sense organ running the whole length of the body and this appears to be able to appreciate alterations of pressure and displacement of water, giving them indications e.g of the approach of other and probably enemy fish etc An interesting feature of this organ is that it is under the control of the vagus nerve

The physical examination is both general and local the former covering the body as a whole the latter the localised area calling for particular attention and both being carried out systematically by eyes fingers and ears in that order In both too special examinations may be necessary especially in the local investigations

General Examination

The facial appearance and general impression as to the state of health are the first points to be made and trained observation developing with experience is essential The personality and character of the patient are assessed at the same time and they have an important bearing on the natural reactions to any abnormal influence

The *colour* of the face is significant whether it shows normal excessive or reduced vascularity whether this is even or patchy whether there is cyanosis sallowness jaundice or other pigmentary changes

The *expression* of the face is frequently striking whether dull excited anxious frightened staring or indicative of pain in the last sometimes even suggestive of its situation with headache the upper part of the face is chiefly affected with frowning and puckering of the brows whereas in abdominal pain mainly the lower half of the face is likely to be involved with a tendency for it to sag Fullness of the face commonly indicates a well nourished individual but it may be the result of oedema and this is likely to be chiefly of surgical interest when it is localised and unilateral e g in scalp or bone infections

A sunken face, on the other hand, may mean emaciation, but it may simply point to empty veins whether pterygoid or orbital e g, in shock haemorrhage or dehydration

The condition of the *parotids* should be noted They are not obvious in the average face but their hypertrophy which produces the pig like face is never present except in gross feeders and the special importance of this observation lies in the fact that these individuals will almost never acknowledge their failing

The *eyes* are noted next the conjunctivae, their colour and appearance the corneae opacities irregularities and possible ulcers and the pupils their dilatation or contraction their equality, regularity and reactions All of these observations may be of value and importance

The *tongue* will also give quite a lot of information A firm narrow tongue with a point like a spear head usually indicates good general health and a good appetite A large flattish flabby tongue with no point usually indicates poor general condition with poor appetite and digestion suggestive of chronic prolonged ill health

Rutherford Morison gave the following clinical observations

> A plastered tongue indicates fever
> A moist brown tongue suggests loaded bowels
> A dry brown tongue suggests failing circulation
> A moist scarlet tongue suggests pus
> A dry red tongue suggests failing assimilation

While the white plastered tongue accompanies fever such as obtains in diseases like influenza and pneumonia it also occurs at first in the common surgical pyogenic infections though if these persist it changes to a brownish colour On the other hand in B coli infections e g, acute appendicitis the furring of the tongue is brown from the beginning and is associated with a malodorous breath as a rule

During the examination of the tongue the condition of the *teeth* and the *tonsils* is recorded

The *temperature* and the *pulse* are next noted It is well to keep in mind that a single observation of the temperature gives a very limited amount of information If it be raised it may indicate an inflammatory condition but it will probably give no definite idea of the type of inflammatory fever present and in such a case it is also important to remember that the time of day may have a marked influence on it The absence of a rise of temperature on a single observation does not necessarily negative the presence of an inflammatory condition On the other hand the presence of a subnormal temperature is to be expected in the more severe cases of shock and collapse In order *therefore to get the maximum information* from the temperature it must be observed over a period

The points to pay attention to in the pulse are its rate size volume

and tension while the condition of the arterial wall should be noted, as to thickening and calcification

To complete the general examination the condition of the bowels lungs kidneys heart blood and the nervous system should be investigated

LOCAL EXAMINATION

This must be carried out in the same routine way as the general examination, i e by inspection palpation percussion and ausculta tion in this order, and their detail will be left to the various regional conditions to be considered later One point however, of never failing importance is that *where the condition is unilateral both sides should always be examined so that the normal and the abnormal may be compared* A degree of abnormality which might escape attention if examined by itself is often rendered obvious when the sound side is also investigated at the same time On the other hand, what might be regarded as an abnormality if only one side be examined may prove to be simply a variation within normal limits, in other words a specific feature of the individual Limbs and other parts of the body just as noses present a wide variation in their development and appearance without being considered abnormal or pathological at all events by the owner

This covers a wide field and offers a great variety of investigations which as already mentioned, are usually indicated by the original nature of the suspected disease and in most cases on the local examina tion Their detail will be considered later

PRE OPERATIVE DIAGNOSIS GENERAL AND LOCAL

The importance of this cannot be exaggerated It is the natural result of a careful consideration and assessment of all the data obtained but *the margin of error may be considerable and is the greater the less* the competence of the patient and the doctor Where both are at fault the likelihood of a correct diagnosis is very remote

In spite of this an attempt at a pre operative diagnosis should always be made and where it is wrong it is worth while remembering that the humiliation of failure is softened by the realization that one learns most from one s mistakes

The importance of a correct diagnosis however is emphasized by the fact that it controls in great measure not only the question of prognosis but also that of treatment and its absence therefore relegates both to the sphere of empiricism and even quackery

As one has insisted elsewhere the positive method of diagnosis which is the direct induction from the data to hand is the more simple and straightforward whereas the negative method of diagnosis con sisting as it does of a consideration of all the possibilities and their

gradual elimination until the most likely is left, is a much more indirect and prolonged procedure, and should only be required in a small percentage of cases

Pre-operative Prognosis General and Local

This again is of the utmost importance especially from the patient's point of view, as there is no doubt that the chief thing he wants to know is whether he is going to get better, and if so whether completely or only partially so Necessarily, it can only reasonably be expected to be correct if the diagnosis is right and the doctor has a thorough knowledge of the disease and its pathology From the student s point of view it forms an exercise of judgment second only to that of diagnosis in its educational value Here also the student is likely to learn more from his mistakes than his successes, but with experience the mistakes tend to lessen and become more infrequent

Treatment

This calls for no comment, but from the point of view of note taking and records it is essential to give a full description of all treatment carried out, whether general or local, non operative or operative

Post Operative Diagnosis

Post operative Macroscopic Microscopic, Bacteriological Apart from the record this is of chief value to the student as the condition can now be described definitely and correctly and comparison can be made with the pre operative diagnosis Where mistakes if any, have occurred their explanation will be forthcoming and, as a result, short comings and failures can be adjusted With a thinking student such lessons are unlikely to be forgotten

Post Operative Prognosis

Post operative General and Local The same applies here as in the post operative diagnosis viz that a correct prognostication of the case can now be given and a comparison with the pre operative one made in detail

Subsequent History

This is also important for record but it will be of value in addition in illustrating the variability in the evolution of disease in different individuals subject to the individual differences in reaction to it

Where the disease has been eradicated, whether by non operative or operative methods the end results will be seen accompanied or not by deformity or disablement according to the destruction pro duced by the disease or its removal

SCHEME II

INJURIES IN GENERAL SPECIAL FEATURES

Definition An injury comprises the sum total of the destructive effects produced by any outside agent or irritant

The destructive effects are both general and local, the general constituting shock the local including (*a*) tissue destruction producing a wound of which the commonest accompaniment is haemorrhage, and also (*b*) functional destruction which is special to the part affected

HISTORY PRESENT CONDITION

Condition of the Patient before the Injury This is important, as a fit individual stands up to an injury much better than one who is below par for any reason

The results of similar injuries vary greatly in different patients If caught unawares, without being able to brace up for it the effect is much more severe This is well seen in the boxing ring when terrific punishment can be tolerated

Time of Occurrence This gives the length of time which has elapsed between the injury and the examination and so the likely stage in which the patient is found

The average injury presents three stages occurring in sequence their duration varying very materially according to its nature and severity

(*a*) The first stage is that of shock and represents the destructive effect on the individual as a whole primarily through the nervous control but later chiefly through the vascular connections with the periphery

(*b*) The second stage is that of recovery from the shock before the local effects have become prominent This is the dangerous stage since it is at this period that the local damage may be missed Fortunately it is usually short and may be absent in very severe injuries especially if haemorrhage is excessive or gross local destruction of vital tissue takes place

(*c*) The third stage is that where the local manifestations assert themselves These are essentially haemorrhage sepsis and functional disturbance

Haemorrhage and functional disturbance occur very quickly in many cases whereas sepsis takes some time to develop

Nature of the Cause If this can be ascertained it is often helpful in indicating the likely detail of the injury The circumstances too under which the injury occurred are likely to affect the result, e g whether anticipated or not, whether in hygienic conditions whether in foul or clean surroundings etc

Severity of the Injury Here the time relationship is so very important as the severer the injury, the more serious all the destructive effects are likely to be and this is reflected in whatever stage the patient is seen Commonly the description of the occurrence gives a good idea as to its severity

Situation i e of the local injury This is important because of the different tissues likely to be affected and in consequence the different results likely to be manifested e g whether brain lung liver or other tissue is damaged

Shock As the patient is often not seen in the early stage the degree of shock produced may be reasonably well described either by the patient or the onlookers and it is important to note whether it occurred at once or developed later It is of considerable importance to know whether the shock was primary or secondary, and hence whether it was a purely nervous phenomenon or whether it was probably due to tissue damage and therefore circulatory in origin In many cases primary shock passes insensibly into the secondary type, and perhaps one of the best examples of this is seen in burns

Wound The presence or absence of an open wound is of course of especial importance in relation to sepsis but it may be of importance also in relation to haemorrhage With an open wound haemorrhage if it occurs tends to do so externally and the detrimental effects are entirely due to the blood lost On the other hand with a closed wound the loss of blood may be of less importance than the pressure produced by its extravasation—this is particularly evident in cranial injuries

Haemorrhage Should external haemorrhage have occurred its amount and type may often be obtained though, particularly with blood estimates are likely to be exaggerated On the other hand the spurting nature of arterial haemorrhage is usually readily observed and a story of this may be of the greatest importance, since the bleeding may have ceased by the time the patient is seen

In cases of internal haemorrhage we do not expect to get much information in the history though there may be a story of definitely increasing pallor

Sepsis In early cases the only likely indication of sepsis being present will be the presence of an open wound and its fouling in one way or another As for some hours in the average case the organisms do not penetrate deeply into the tissues there may be little except the history

to rely upon. Later probably the pain of inflammation would not be missed by the patient, and so would come into his story

Functional Disturbance This will naturally vary with the tissue injured and may or may not have been obvious to the patient. An excellent example of loss of function which the patient is able to register is on the case of fractures especially of the lower limb bones, where the normal support is lost and the patient is no longer able to stand up The nature of the functional loss will frequently give absolute evidence of the tissue affected

PHYSICAL EXAMINATION GENERAL

Does the patient present any evidence of shock, and, if so what is the degree of severity?

Facial Appearance All degrees of shock are met with the milder giving little or no clinical indication. The more marked cases present a pale hollow-eyed sunken-cheeked appearance, due primarily to dehydration and commonly accompanied by obvious sweating, especially noted on the forehead The expression is dull and apathetic and the body as a whole is completely relaxed and toneless

The Pulse Depending on the degree of dehydration the pulse is diminished in size and increased in frequency, but the blood pressure does not fall primarily As the heart fails rapidly if it receives an inadequate blood supply which follows closely upon the dehydration and consequent loss of blood volume a fall in blood pressure is so constant a feature of clinical shock, that it is commonly taken as a direct measure of the degree of shock present. It will be readily appreciated that if there is no fall in blood pressure the degree of shock is very mild

Temperature The temperature is subnormal, varying with the degree of shock present. It is due also to the diminished volume of the circulating blood supplemented by heart failure.

PHYSICAL EXAMINATION LOCAL

The local conditions depend upon the destruction produced in the structure and the function of the part.

EVIDENCE OF STRUCTURAL DAMAGE

INSPECTION IF THERE IS A WOUND

If a wound is present, many features are of importance The *situation* will give a pointer to the tissues likely to be involved and the possible complications Its *size* including the apparent depth, will suggest its seriousness and extent. The *type* whether incised punctured or contused and lacerated or a combination of these will present information as to the likely causal agent, and also help to assess its seriousness

Haemorrhage If bleeding is present, its amount and type should be noted If there is no active bleeding there might be evidence of its having been present, and the indications of its amount should be looked for on the clothing or the dressings It is important to keep in mind that in extensive lacerations, even up to the tearing off of a limb, no haemorrhage may take place at any time, the laceration as opposed to cutting offering the ideal conditions for arresting any bleeding from the injured vessels

The possible involvement of deeper parts, blood vessels, nerves tendons bones joints viscera etc, must always be considered, and no examination is complete without confirming or negativing this The early recognition of such injuries may make all the difference in the world to the outlook in the case and failure to do so is a definite example of neglect and as such punishable As examples one might quote (*a*) the case of a patient being found to be paralyzed after recovery, and the doctor may be held responsible if he were not able to negative its presence at the time of his examination (*b*) in some cases of fracture gangrene may follow distally due either to pressure of displaced frag ments or injury to the main vessels at the time of the accident The doctor should have noted damage to the vessels at the time and failure to recognize this may quite reasonably result in his being blamed for not having properly reduced the deformity

Inspection If there is no Wound

If there is no open wound, haemorrhage may still have taken place and damage to deep structures may be present It is essential to be certain of this

Haemorrhage may be indicated on the surface by ecchymosis and possible haematoma formation but these may take some time to develop depending on the extent and depth of the bleeding On the other hand depending again on the situation of the injury, internal haemorrhage may have occurred and its indications must be looked for as its recognition may make the difference between life and death to the patient The most easily recognized indications of a continued internal haemorrhage are the steadily rising pulse rate with the pulse diminishing in size the falling blood pressure and the increasing anaemia

Involvement of deep parts must be investigated in these cases just as urgently as in the previous type and the absence of an open wound may increase the difficulty in coming to a decision as e g in cranial injuries

The evidence of *sepsis* in the early stages may be simply that of contamination, as seen by the gross fouling of a wound It is usually only after several hours that the inflammatory reaction to the sepsis

becomes evident, following the penetration of the tissues by the organisms which commonly takes 12 14 hours

Palpation

This may not only confirm what has been noted on inspection but may produce further evidence of damage done

Tenderness, i e pain elicited by pressure may indicate the site of injury either superficial or deep and is particularly of importance should the patient not be complaining of pain or perhaps be too shocked to take notice of it

Rigidity i e contraction of muscles may similarly indicate injury to the affected muscle itself or it may represent the guarding of the site of a deeper injury, and as such is of the greatest clinical importance

Bone and joint *injuries* and *displacements* will be felt for especially if the sites of injury are compatible

Surgical emphysema is another frequent concomitant of injury Over the chest it strongly suggests a fractured rib with penetration of the lung but it may occur anywhere if a muscle has been torn or cut across and the contraction of the muscle belly has sucked in air On the other hand it may be indicative of infection by gas forming organisms suggesting the development of gas gangrene an exceedingly serious condition

Percussion

This is chiefly employed in examination of the chest and the abdomen to demonstrate solid fluid or gas abnormalities and in the case of fluid and gas their occurrence free in the involved cavities On the other hand, percussion of solid tissue may demonstrate the presence of gas and may be diagnostic e g *of the presence of gas forming organisms*

Auscultation

This is chiefly of use in examination of the chest but the limitations of its value as to provision of exact information must never be lost sight of

On the other hand it is useful in the demonstration of vessel injuries with resulting aneurysmal development of various sorts

Evidence of Functional Damage

This must be obtained by the same routine procedure of examination as outlined above but it is so essentially special to the part involved that it calls for no detailed consideration at this juncture

It covers the nervous cardiovascular respiratory alimentary genito urinary osseous and muscular systems and will be discussed with diseases of those systems

SCHEME III

INFLAMMATION IN GENERAL
SPECIAL FEATURES

Definition Inflammation is not a disease, but is the reaction of the body both generally and locally, to any irritant, whether infective or non infective It is therefore, an indication of the presence of some irritant the most important clinically being infective organisms, and the commonest of these, surgically being the pyogenic ones

As the average layman is fully aware of the ordinary manifestations of inflammation it is usually easy to obtain a reliable story of the more outstanding features

The general part of the reaction gives rise to inflammatory fever and most individuals have had experience of this with its feeling of being too hot its loss of appetite, general feeling of malaise, etc The local reaction on the other hand, has pain for its most prominent symptom, but the redness swelling and heat etc are also quite familiar to him It is the pain, however which makes the greatest impression on the patient and usually brings him to the doctor

In chronic inflammation fever is unlikely to attract the patient s attention and the local swelling is much the commonest complaint as pain may be minimal or absent

HISTORY PRESENT CONDITION

Duration The actual length of time the patient has been aware of the presence of inflammation necessarily varies in its significance as to whether we are dealing with an acute or chronic condition In acute inflammation the question of hours or days may be of the greatest possible importance whereas in chronic inflammation the duration may be measured in weeks, months or even years In either case the duration usually controls the possible developments which have had time to occur including the extension of the underlying condition whether by contiguity or continuity of tissue, lymphatics or blood stream and also the termination of the inflammation viz, resolution fibrosis partial or total destruction Toxaemia and septicaemia may be obvious in a few hours to a day or two while the evidences of pyaemia are likely to be postponed for 7 10 days An acute abscess is unlikely to be present in less than 3 days

In the earliest stages of acute inflammation the patient's attention is likely to be focussed on the general fever, whereas later the local developments become increasingly prominent and the pain will overshadow anything else

In chronic inflammation, on the other hand, the local manifestations continue to be the outstanding feature throughout, unless complications as, e g a general spread of the disease or secondary infection, take place The swelling and not the pain is likely to be the most prominent feature

Cause assigned, if any In the absence of appreciation by the patient of the nature of infection, he is liable to attribute most things to a mechanical cause and all importance may be given to some small abrasion without the realization that it may only form the avenue of entry of the real cause of the mischief Under these circumstances his statement will represent a half truth only, though it place correctly the commencement of the condition

Some points of interest are worth remembering in these infections A patient often develops an immunity against his own organisms and, therefore, the tendency is for local infection from his own skin not to be of a very serious nature, whereas if the organisms are introduced from some extraneous source we may meet the most virulent infections In some cases, too, the virulence of similar organisms appears to vary greatly at different ages e g the skin streptococcus of children is much milder than that usually seen in adults as instanced by the development of impetigo in the young and erysipelas in the old

Further, organisms are likely to become attenuated by their passage through the blood stream and hence secondary pyaemic abscesses e g perinephric abscess are likely to show much milder evidences of their presence than in the case of primary acute abscesses

Evidences of General Inflammatory Fever Whatever the type of fever present there is always a toxaemia and as a result the patient is likely to give indications of it, e g the feeling of being fevered the loss of appetite the feeling of malaise and lassitude with headache thirst constipation etc These will be noted from the earliest stages and often indicate the commencement of the trouble

Evidences of Local Inflammation The situation of an inflammatory focus as indicated by the patient is suggestive of the tissue or organ involved so much so that the patient quite often comes with his own diagnosis from a smattering of knowledge of his anatomy The patient is apt to be somewhat diffuse in his indications and it is well to get him to show by the tip of a single finger what he regards as the focus of trouble A latitude of an inch or two in such a demonstration will often make all the difference between a right and wrong diagnosis

Pain The pain in inflammation is essentially due to increased tension in the tissues and the more rapidly and easily this tension is increased the greater its severity Consequently the degree of pain varies directly with the acuteness of the inflammatory reaction i e, the rate at which the inflammatory exudate occurs, its amount, and the rigidity of the tissue affected (Experimentally, the same applies to the injection of any fluid into the tissues, the more rapidly it is done and the greater amount that is injected, and the firmer the tissue injected the greater the pain experienced) It is continuous while the tension lasts It is increased by dependency and relieved by elevation of the part by the increase or diminution of static blood, and it is more likely to be relieved by blood pressure reducing drugs e g, aspirin than by opiates It is commonly felt at the site of the focus but may be referred in the distribution of the somatic nerves controlling the affected part

An unusually severe degree of pain commonly means a very virulent infection with a marked reaction and if unrelieved, is particularly prone to be followed by septicaemia generally, and gangrene locally

When pus has formed, the pain, while retaining its continuous character now becomes throbbing in type the throbs being synchronous with the pulse beat It is due to increased tension and the displacement of the fluid, which cannot be compressed, by the increased blood flow with each systole

As would be expected, in chronic inflammation where the inflammatory exudate is small in amount and occurs slowly, the pain is relatively mild and in many cases is not complained of at all

Pain due to bone inflammation is usually worse at night—in other tissues this is not so

Serous cavity pain is described as lancinating or stab like

In inflammation of the hollow muscular systems the pain is usually continuous as in other parts, but there is commonly in addition, the occurrence of exacerbations due to the intermittent peristaltic contractions which may be present This pain is particularly likely to be referred to the peripheral segmental distribution

Swelling Swelling in inflammation is due to hyperaemia inflammatory exudate and cell proliferation In acute inflammation it is mainly due to cellular proliferation The patient is only likely to be aware of it if it is either superficial or excessive He is unlikely to be able to give much detail of it except that it is tender on pressure Indeed the pain produced by handling it tends to prevent him investigating it Redness also is only likely to be observed by the patient if the focus is superficial seeing that it is due to the hyperaemia In place of this diffuse superficial redness he may have noticed an increase in the size of the surface veins where the inflammation is situated deeply In chronic inflammation there is usually little or no redness even with a superficial focus Heat

which is due to hyperaemia, is also unlikely to be observed by the patient unless the focus is superficial

Impairment of Function This is much more likely to form part of the patient s story as movement of the affected part produces or in creases pain by increasing tension and therefore, the tendency is to keep the part as quiet as possible Even necessary movements will be circumvented as far as possible to avoid resultant pain and this is well seen in such cases as joint inflammation, where the movements are greatly restricted causing limping etc

PREVIOUS HISTORY

A history of a previous condition of the same sort is important especially if it occurred at the same spot The reason for this is simple In an attack by infecting organisms which has been overcome the organisms present are not as a rule all destroyed or removed There is an incomplete cleaning up and those organisms which are left attenuated and temporarily rendered innocuous are shut off in small pockets Later, due chiefly to some devitalising cause affecting the general body resistance or that of the local tissue, these organisms may flare up and produce a recurrence of the original condition An excellent example of this is the repeated attacks of erysipelas which may be met at the same site sometimes even 3 or 4 occurring The same thing is seen in recurrent pneumonia

PHYSICAL EXAMINATION GENERAL

Evidences of Inflammatory Fever Keeping to the normal routine of examination much or little of general or special interest may be observed

The facial appearance can be very enlightening In acute fever of any sort the face is usually red and flushed, may even look somewhat puffy and swollen while the conjunctivae are suffused These appear ances vary with the degree of fever and are only likely to be marked in the more severe cases If the associated toxaemia is pronounced the expression may be listless and apathetic, but it must be remembered that there may be instead a brightness of eye and appearance of mental activity much above the normal suggesting excitability rather than depression of cerebal function

In chronic inflammatory conditions on the other hand the face may register little or nothing but in those cases so frequently seen surgically where chronic sepsis is present either alone or as a com plication of tuberculosis or syphilis the so-called hectic flush is the characteristic feature Here the face as a whole is pallid as a result of the secondary anaemia present indeed may have a semi translucent look but a localised rounded patch of hyperaemia is seen on either cheek in the malar region the so-called malar flush'

The face may also give evidence of loss of flesh and emaciation, particularly in the more prolonged and chronic cases and the eyes and cheeks may appear sunken

Jaundice in varying degree may be present due to pathology in the blood liver or bile ducts and as such may be an important observation In some of the chronic anaemias the colouration may be such as to suggest a mild degree of jaundice where none is present Should the heart tend to fail the face is likely to show some cyanosis with the congestion and circum-oral pallor is likely to develop

Temperature With fever the temperature is elevated and it may vary widely Its height cannot be judged by inspection but many experienced clinicians can estimate it fairly correctly by palpation As the temperature in the varying types of fever may vary at different times of the day a single observation of it may give very inadequate information or even mislead

In the average surgical fever the temperature tends to rise in the evening and fall in the morning but there are many modifications in this A progressive acute infection tends to produce a sustained temperature without fluctuation Should the case proceed to a fatal termination the temperature may either rise continuously up to the time of death or it may steadily fall to subnormal before that event Should the case however proceed to get well the temperature as a rule slowly drops to normal

Where pyaemia develops there is a tendency for repeated rigors to occur most commonly at 24 hour intervals and with each the temperature may rise even to 106° F with a drop to subnormal between them

When pus forms the temperature takes on the so called steeple type with an evening rise and a morning fall In such cases until the infection is completely controlled the morning drops do not reach the normal line so the relation of the individual to his infection can be gauged

A striking anomaly in fever temperatures is the occurrence of the inverse temperature where the rise takes place in the morning and the fall in the evening This where it is met is likely to indicate an underlying tuberculosis condition

Pulse The pulse in the ordinary inflammatory fever is usually regarded as rising 10 beats per minute for each degree rise of Fahrenheit temperature registered This refers to early cases especially and we meet with many apparent contradictions of it

Where the temperature is varying during the course of the day the pulse will often retain a more steady level Following a rigor with the temperature dropping to 97° F or even 96° F the pulse may be registering 160 per minute

In the more prolonged and chronic cases where the patient's general vitality has been greatly lowered, the pulse is likely to be permanently quickened, without relation to temperature at all

In cases of chronic jaundice, or where there may be an intracranial inflammatory focus the pulse may not only not rise as is ordinarily expected, but it may even be slower than normal

Tongue The varying appearances of the tongue have already been referred to (see General Scheme)

In very severe cases of infection especially if lasting 2 or 3 days the presence of sordes on the lips and teeth is commonly noted The tongue is more apt to be dry in these cases

When the patient is *in extremis* i e, where death is very near or strongly indicated a clinical feature, which is rarely mentioned may be observed This is the disappearance of the half moons at the base of the nail bed It indicates an extreme degree of failure of the peripheral circulation

PHYSICAL EXAMINATION LOCAL

Confirmation is sought of what the patient may have described, but in many cases the local evidences of inflammation are only brought to light on examination

Inspection

Redness, or dilated veins in the presence of a deep focus, indicates hyperaemia

Swelling may be diffuse or localised In early acute inflammation it tends to be diffuse with ill defined limits while later it often becomes much more circumscribed This is due to the inflammatory exudate which takes place more or less widely and which is first absorbed at the periphery of the focus In chronic inflammation on the other hand the swelling tends to be localised at first and only later becomes diffuse by extension of the process commonly by continuity of tissue

Impaired Function This is demonstrated voluntarily by the patient and is due to the active contraction of the adjacent or controlling muscles with the object of keeping the part at rest though the patient only appreciates it as a means of preventing the occurrence of pain or at all events of avoiding an increase of it by movement The pain results from the increased tension produced It is well to bear in mind that some patients feel pain much more than others and are therefore more afraid of it In these hypersensitive individuals it is helpful to try and distract their attention while they move the part

The impaired function especially limitation of movement in the case of joints particularly is often brought out much better by this voluntary effort than in a passive way by the clinician The patient s

fear of pain will frequently be so pronounced that he has the greatest difficulty in controlling or preventing an inordinate contraction of his muscles and hence he may avoid any movement at all Where his attention can be distracted by the doctor movements gently carried out may be obtained greatly in excess of what he is able to perform himself and consequently it may be more difficult to demonstrate limitation

A striking example of the voluntary control of muscle contraction is seen especially in joint movements in the more advanced cases As the infection and inflammation persist and progress destruction commences to take place in the joint Coincident with this the stronger muscles controlling the joint (the flexors) tend to overcome their opponents and so produce a tendency to increased flexion of the joint As this will diminish the maximum capacity of the joint and so lead to increased tension the patient prevents its occurrence as long as he is able As however, he passes off to sleep he loses this inhibitory control, and there is a more or less sudden pull of the flexors The tension increases at once and the patient is awakened fully by the sudden jab of pain which results This is so characteristic that it constitutes what are described as night starts and are diagnostic that the joint condition has entered on the second stage with commencing destruction The patient will himself describe such occurrences fully and clearly in giving his history

Palpation

Particularly in inflammatory conditions and especially in acute ones the greatest possible gentleness must be employed in palpation if the maximum or, in some cases even any information is to be obtained It has been aptly stressed by describing the palpation as a caress', suggesting something that will soothe rather than hurt the patient One must never forget that if, at the beginning of an examination one causes the patient pain it may produce such an antagonistic atmosphere that no further investigation may be permitted This is so important that in a particularly nervous and sensitive patient it is often a good thing to start palpation at some spot definitely outside the area of which the patient complains This will frequently give him confidence and he will allow much more freedom in the subsequent really important part of the examination

Heat This which is one of the commonest and most important evidences of inflammation is the first point to be elicited As it can be appreciated by the merest touch of the fingers, the patient will at once appreciate the clinician s gentleness or roughness and success or failure may be decided straight away The amount of heat will depend on the acuteness of the inflammation and the depth of the focus It

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streptococcal cases In staphylococcal cases too it tends to be harder because of the likelihood of coagulation but on the other hand this hardness may be simply the result of its excessive amount In the ordinary case this increased hardness will indicate a probable staphylococcus infection but in a streptococcal case it usually means an unusually severe infection with a corresponding reaction and it is accompanied by very severe pain because of the great tension In the staphylococcal case the hardness is not accompanied by the amount of pain that might be expected

While the common site of the infections is the subcutaneous tissue and the resulting oedema causes a smooth surfaced swelling when the cutis is involved the distension by the exudate produces the so-called pig skin appearance or *peau d orange* This is due to the ducts of the skin glands and hair follicles causing pits in the swelling as the ducts are not extensile It is likely to be quite painfull It must be kept in mind that oedema due to lymphatic obstruction leads to solid oedema i e one which does not pit on pressure and in which as a rule the signs of active inflammation are absent including pain It is also a point to remember that brawny oedema is frequently a sign of deep seated pus Puckering or wrinkling of the skin over an inflammatory focus is indicative of absorption of inflammatory exudate and of the retrogression of the condition with the tendency for it to clear up

A not uncommon occurrence is for a patient to be sent to Hospital as a case of cellulitis where an insect bite or sting is responsible for a swelling often quite extensive which is of 24 hours duration or so The patient may have no recollection of the bite and the doctor may be deceived by the widespread oedema which may be under considerable tension and showing a varying degree of hyperaemia The degree of swelling depends on the virulence of the bite or sting and on the laxity of the affected tissue e g the scrotum may be grossly swollen and in the more virulent cases some haemolysis may take place locally As a rule there is no general inflammatory fever i e there is no raised temperature and no leucocytosis and intense itching which is usually not continuous is complained of rather than pain The most striking casual observation is the patient s lack of concern and the absence of any appearance of being really ill Naturally it is important to diagnose the condition as the treatment is essentially non operative indeed, the focus quickly clears up spontaneously as a rule

Fluctuation The presence of fluctuation is the characteristic sign of the presence of fluid and it consists in an expansile impulse at one part of the swelling produced by pressure at another due to the displacement of the fluid It may be impossible to demonstrate it if the focus is deep and care must be taken to differentiate it from the normal fluctuation obtained in muscle bellies which is always transverse to the

means increased vascularity and the commonest cause of it is inflammation Other less common causes of it such as rapidly developing neoplasms or vascular anomalies will be discussed in the proper places

Tenderness This is pain which is elicited by pressure, and is due to an increasing tension produced thereby in the affected part The greater the tension already present the greater the pain caused is likely to be and the more easily it can be produced Consequently the more acute the inflammation and the more rigid the structure in which it occurs the more exquisite is the tenderness associated It is particularly marked in structures like bone and its periosteal covering and children suffering from acute osteitis will often prevent one from touching the affected region at all indeed they can scarcely bear the weight of the bedclothes on the part

The point of maximal tenderness is usually the site of most advanced mischief and in abscesses indicates the position of likely natural discharge and therefore usually where it should be opened It is best and most accurately demonstrated by using a probe point very gently to produce the pressure

While in composite tissues inflammatory exudate is the commonest cause of increased tension in the hollow muscular systems obstruction with or without inflammation is a common occurrence and cause of increased tension and the tenderness produced is an equally important diagnostic sign

Impaired Function In this case the evidence is obtained by the clinician and is of a passive nature indicating that the less the part played by the patient the better the information will be In other words it is a great help if the patient s attention can be so distracted by conversation etc that voluntary muscular contraction is reduced to a minimum or avoided altogether for preference The production of pain by the manipulations will most probably demonstrate the limitation of movement e g in the joints but the mechanical effect of the inflammatory exudate itself may be sufficient to do it In the case of deep seated organs like the gall bladder and the appendix it is important to differentiate in the same way between the voluntary overlying muscle contraction caused by the patient to prevent pressure being applied to the organ and the involuntary contraction resulting from associated peritonitis

Oedema This is chiefly demonstrable when present in superficial foci It is the usual thing in acute inflammation but it is not commonly present in chronic inflammation where the cellular reaction predominates The distribution varies with the amount of exudate the type of infecting organism and the depth of the focus It tends to be diffuse and to shelve gradually into the normal surrounding tissue but the tendency to localisation is more marked in staphylococcal than

SCHEME IV

TUMOURS AND SWELLINGS IN GENERAL

SPECIAL FEATURES

Swellings are mostly due to injury, inflammation or neoplastic formation

HISTORY PRESENT CONDITION

How was the swelling first noticed? The chief point of interest here is whether it was noticed casually or because of pain As has been stated, pain by is by far the commonest symptom to call the patient s attention to pathology Inflammatory conditions are usually painful The average neoplasm is not If pain was responsible then the swelling is probably inflammatory and the more acute the inflammation the more likely is this to be so On the other hand, if the swelling was noticed casually it is much more likely to be neoplastic in nature The thinner the patient the more likely is a swelling to be found casually This is very well seen in breast tumours

A primary injury to healthy tissue may produce a swelling due to haemorrhage etc, and this would be painful perhaps markedly so Chronic inflammatory swellings e g those of tuberculosis and syphilis, are frequently without pain

Rapidly growing very vascular and highly cellular neoplasms may cause pain from their rapid increase in size and the distension of sur rounding tissue, but frequently, from degeneration a rapidly occurring haemorrhage may take place and give rise to acute pain

When was it first noticed? How long has the patient been aware of it? Broadly speaking swellings of short duration, accompanied by pain are probably inflammatory, while those of long duration, without pain are likely to be neoplastic and the longer the duration the less the likelihood of malignancy At the same time one must keep in mind the swellings of short duration of traumatic origin with pain and similarly the rapidly growing neoplasms of short duration also with pain Chronic inflammatory swellings may also be of long duration and the longer their duration the less virulent the infection and conse quently the less the pain is likely to be A short history of a swelling however, in the absence of pain, may simply mean that it has previously escaped notice and consequently it may have been of long duration This applies to both chronic inflammatory and neoplastic swellings and it is most important to bear it in mind

direction of the fibres Fluctuation, therefore in the length of a muscle, is not due to the muscle itself

PERCUSSION AND AUSCULTATION

These are not usually of value or indicated, but in regions such as the chest or the abdomen, they may give much information, e g, the presence of dullness due to fluid or of resonance due to gas where these should not occur

SPECIAL EXAMINATION

Blood examination especially of the leucocytes, is of the greatest possible importance A total and a differential count should be made as both vary very considerably and either alone may give very inadequate information The type of infection its degree of severity the reaction to it and the stage achieved may all be assessed readily Hence not only from a diagnostic point of view but also from a prognostic one it is often of outstanding value An investigation of the red cells may less frequently be necessary, especially from the viewpoint of anaemia fragility etc while in a very small number of cases a platelet count may be suggested

Bacteriological examination of the blood tissue fluids or discharge may be of considerable value while serum examination including the Wassermann test and the possible demonstration of bile pigments may be suggested and be of help

Radiography, with or without additional aids may also prove of great assistance in determining the exact situation of a focus and its extent and relations e g, in bones perinephric abscess, chests etc

and in this respect it is essentially different from the inflammatory swelling

PREVIOUS HISTORY

Chronic Irritation The story of a previous chronic irritative lesion e g chronic superficial glossitis chronic ulcer or sinus anywhere, or a scar that is always breaking down, has a very special bearing on the possible later development of carcinoma

Similar Swellings The story of previous similar swellings having been noted is a strong point in favour of their being inflammatory since as mentioned above the infection is often only partially dealt with and consequent recrudescence may occur

On the other hand it is not the usual thing for previous similar swellings to have been found in cases of neoplasms which are mostly single At the same time exceptions to this rule are not infrequently met e g in simple tumours multiple lipomata neurofibromata and papillomata and in the malignant tumours multiple rodent ulcers which sometimes exhibit a local spontaneous cure

Enlarged Glands A previous story of enlarged lymphatic glands favours infection and inflammation and in the case of malignant neoplasms which alone give rise to enlarged glands they follow the discovery of the primary focus rather than precede it

Abscesses The previous occurrence of abscesses also naturally favours infection and inflammation as they represent the third termination of inflammation and in both acute and chronic infections may develop in relation to the corresponding inflammatory swellings Should malignant glands have broken down and become infected they are unlikely ever to heal but get progressively worse as the disease extends

PHYSICAL EXAMINATION GENERAL

The first point and a very important one is to decide if there is or is not a swelling It is not uncommon for a patient especially a highly nervous and introspective one to feel some normal structure for the first time and to decide at once it is a tumour Indeed the cancerophobe will frequently be satisfied there is a cancer present even though he or she has been unable to find anything definite at all

If there is a swelling the *routine* examination of it must be carried out together with the general examination of the patient as usual

In the general examination features supporting an inflammatory condition acute or chronic must be looked for (see Inflammation Scheme III) So far as neoplasms are concerned the chief observations are made in relation to cachexia and emaciation and it is well to remember that this condition is mainly produced in malignant disease through the addition of a secondary septic infection of the focus and

due to peristalsis In both cases the pain is referred in the segmental distribution corresponding to the viscus Such pain may precede or follow the discovery of the swelling

In the serous cavities infiltration involving and irritating the parietal serous membrance will produce a local pain of the lancinating or stabbing type aggravated by any movement of the parietal serous membrane over the swelling

The situation of the pain in relation to the swelling is an important point in diagnosis In most cases it is localised to the swelling whether it is inflammatory or neoplastic, but when nerves are involved or in the case of hollow muscular systems the lumen is encroached upon the pain that ensues is referred in the distribution of the somatic seg mental nerves involved A correct judgment of the pain relationship therefore, may give *all* the detail as to what is *actually* taking place in the swelling e g, a carcinoma of the rectum with involvement of the surrounding tissues and the sciatic nerve

Rate of Growth and Possible Fluctuations in Size As usual the path ology explains the varying features of the swellings Those due to traumatism alone develop very rapidly remain more or less stationary for a short while and then steadily retrogress and may disappear altogether This depends on the fact that haemorrhage is mainly respon sible and in the absence of infection the outcome should be as described The serous cyst resulting from organisation of the clot peripherally ins ead of its absorption is an exception

In the case of inflammatory swellings the time taken for their develop ment depends chiefly on the virulence of the infecting organisms the acute swellings occurring in a few hours or days at the most while the chronic ones may require weeks or months (Figs 2 and 3) As the *commonest clinical cause of inflammatory swellings is infection* it depends on what happens to that as to the subsequent course of events Should the infection be eradicated, the swelling will usually after having reached a maximum slowly decrease and disappear Should it however only be temporarily held in check it tends to recrudesce whenever it gets the chance i e when for some reason or other the general or local resistance of the patient is depleted Consequently in such cases there may be fluctuations in the swellings At times they tend to diminish and disappear at others they tend to recur and increase again This applies to both acute and chronic infections and the resultant swellings

In the case of neoplasms on the other hand the tendency is for progressive growth to take place At the same time degeneration and haemorrhage may occur in the more actively growing ones and this results in a fairly sudden increase in size With the subsequent absorp tion of the extravasated blood the swelling diminishes in size but as a rule it finally remains larger than before the haemorrhage took place



3



4b

Fig 3 Later more localised acute inflammatory swelling (acute abscess)

Fig 4 a and b (a) Chronic tuberculous inflammatory swelling—of long duration still localized (b) later more diffuse tuberculous lesion

Fig 5 a and b (a) Chronic localized syphilitic inflammatory swelling (gumma of masseter) (b) diffuse gummatous infiltration of leg



4a



5a



therefore, the evidence brought to light is often chiefly that consistent with a prolonged sepsis, e g fever, anaemia and loss of weight and condition In the most rapidly growing sarcomas and the encephaloid type of carcinoma, a definite fever is often present with temperature of 102° F or more and even in some cases a leucocytosis These may occur without any septic infection of the focus

PHYSICAL EXAMINATION LOCAL

Inspection

Situation Size and Shape of Swelling All of these observations give information as to the likely origin of the swelling and the tissue it involves sometimes its nature whether inflammatory or neoplastic, and if neoplastic whether it is simple or malignant Inflammatory swellings, especially early acute ones tend to be diffuse shelving into the normal surrounding tissues, while the inflammatory exudate is increasingly absorbed they become more localised and clearly defined On the whole inflammatory swellings are less well defined than neoplastic ones and in the latter the malignant tumours are less well defined than the simple ones Of the malignant tumours, the carcinomas are less defined than the sarcomas which present a greater tendency to capsule formation Of the simple tumours one must not forget that many of them present a diffuse type without a capsule, as well as the ordinary encapsulated form (Figs 4 9)

Size itself is not a specific character but a large swelling of recent origin is likely to be either a fairly acute inflammatory one or an actively growing malignant one while a large swelling of long duration is much more likely to be a simple one usually neoplastic (Figs 10 14)

Mobility or Fixation Inflammatory swellings are more likely to be fixed than neoplastic ones unless the latter are malignant and infiltrating extensively i e are advanced The carcinomas are more fixed than the sarcomas This is well seen in pyloric swellings where fixation suggests inflammation rather than malignancy especially if the swelling is smallish Respiratory movement of swellings is chiefly seen in the abdomen, and the type of movement may be characteristic A liver swelling moves with respiration like a piston in a cylinder unless it is adherent anteriorly to the margin of the thoracic outlet or below this and a stomach swelling lying below the liver may act in the same way Kidney swellings on the other hand move only towards the end of the respiratory excursion

Character of the Overlying Skin Increased vascularity may be evident in both inflammatory and neoplastic swellings It is an essential part of active inflammation and is more marked in the acute than the chronic



1

g 11 Osteogenic sarcoma
the femur of a child Great
alignancy rapid develop
ent considerable pain

g 12 Osteosarcoma of the
ımerus of an adult Less
alignant slower growth
tle pain



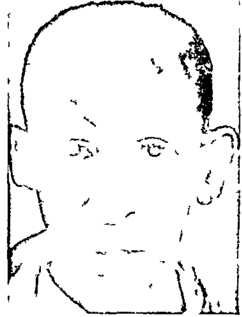
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Fig 13 Encephaloid carcinoma of the left breast Very malig nant rapid development much pain

Fig 14 Scirrhous carcinoma of the breast Much less malig nant slow development no pain



14



6

Fig 6 Localized lipoma (well defined capsule)

Fig 7 Diffuse lipoma (no capsule)

Fig 8 Neurofibromatosis (von Recklinghausen s disease) small localized swellings some with capsules

Fig 9 Neurofibromatosis—pachydermatocele Diffuse lesion no capsule



7

Fig 10 Neurofibroma un noticed until haemorrhage in to it produced a rapid enlarge ment with much pain







developed tertiary syphilitic ulcer the edge is punched out and there may be the wash leather slough on the base

Of the neoplasms ulceration is usually only seen in the simple ones if the surface becomes irritated and abraded by friction or other trauma The ulceration is limited to the site of irritation The nature of simple tumours is such that they do not present sufficient tension to interfere with their blood supply or with that of the underlying skin (Fig 15)

In the malignant neoplasms ulceration is common In the sarcomata the swelling tends to press up under the skin rather than infiltrate it and so produces vascular interference by pressure The skin becomes stretched and shiny When ulceration occurs the sarcoma tends to fungate through it and overhangs the ulcer edge and is separate from it The appearance may resemble an exaggerated collar stud or dumb bell The only sarcoma which commonly infiltrates freely and widely is the lymphosarcoma and the above appearances are only exceptionally met (Fig 16)

A carcinoma however, infiltrates the overlying skin which is finally replaced by it When ulceration occurs it is part of the growth and as such has the characters of a carcinomatous ulcer, with irregular craggy surface raised everted edge and foul often blood stained discharge In some of the encephaloid carcinomas the ulceration may resemble to some extent the sarcoma type A superadded infection in any of the ulcers over neoplasms may modify them considerably (Fig 17)

Pulsation Two types of pulsation must be differentiated, if present Transmitted pulsation is due to the displacement of the swelling by arteries usually biggish ones underneath it It is pushing in type and is usually in one direction only Expansile pulsation is due to the increase in size of the swelling in all dimensions, occurring with each pulse beat and the accession of blood it brings It indicates marked vascularity if tissue is affected as a whole or abnormal dilatation of the vascular lumen if a vessel alone is involved In the hollow muscular systems and the serous cavities an expansile impulse may occur in any sacculation or herniation which has developed should the tension in the parent cavity be increased

PALPATION

Heat and tenderness should first be felt for and as previously stressed the utmost gentleness should be employed, to obtain the fullest confidence of the patient

Heat means increased vascularity and this does not necessarily mean inflammation though it usually does so (*vide supra*) Tenderness means increased tension and this again is mainly inflammatory though by no means always so as the rapidly growing neoplasms especially in resistant tissues are usually also tender

type When superficial it presents a diffuse redness due to the marked capillary dilatation whereas, when it is deep redness may be absent and the increased vascularity show up as dilated veins

In the neoplasms increased vascularity is usually an indication of marked activity In simple tumours it is not usually seen unless the vessels form an integral part, e g, angiomata or inflammation is present as a complication In malignant tumours the appearances vary considerably and in any case tend to be more localised than in inflammation In the sarcomata, which are mostly deep to the subcutaneous tissue and do not usually infiltrate the skin, redness is not usually seen and on the other hand marked enlargement of the superficial veins may be a pronounced feature

In scirrhous carcinoma there is usually no evidence of increased vascularity but where it has infiltrated the overlying skin and is limited to this area there is quite commonly a definite increase in blood supply as seen by enlargement of the individual small veins giving a bluish appearance to the area It is quite different from the diffuse redness of inflammation In encephaloid carcinoma on the other hand with its rapid growth and widespread infiltration, vascularity is greatly increased and may be such as to be distinguished with difficulty from acute or subacute inflammation If it is deep the large veins are the prominent feature but if it is superficial in addition to big surrounding veins there may be diffuse redness just as in the case of the more acute inflammatory swellings This may be so marked as to lead to the growth being incised on the supposition that it is an inflammatory focus Oedema may be present but more information is obtained about it from palpation than inspection However while diffuse oedema may be suggested rather than positively diagnosed the pig skin or *peau d orange* variety will be readily recognised It is not commonly a feature of inflammation unless the cutis itself is involved as in erysipelas but it is a characteristic finding in cases of carcinoma infiltrating towards the skin and blocking the underlying lymphatics In such cases it is a bad prognostic feature

Ulceration Ulceration representing the third termination of vascular interference may occur in both inflammatory and neoplastic swellings In inflammatory swellings it commences at the centre of the focus and therefore occupies the most prominent part as a rule It varies with the type of inflammation

In acute cases we may find in addition small sloughs present on the surface a raised bright red edge an infiltrated base and a copious discharge of thick pus blood stained at first In chronic cases there is much less vascularity and more cellular change, and the parts have a bluish unhealthy appearance In tuberculosis there is a ragged moth eaten bluish edge which is irregular and undermined In the fully

developed tertiary syphilitic ulcer the edge is punched out and there may be the wash leather slough on the base

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15a



15b



16

17



Fig 15 a and b Ulceration over simple tumour (lipoma) *Pressure destruction from without* no fungation

Fig 16 Ulceration over sarcoma of the belly wall Pressure destruction from within with fungation

Fig 17 Ulceration over secondary carcinoma of the inguinal glands Infiltration destruction and crater ulcer formation

The routine examination of a swelling by palpation includes the consistency the surface the edge and the relations to surrounding parts

Consistency The consistency of a swelling will naturally vary according to its pathology and this applies not only to the swelling as a whole but to separate parts of it In an inflammatory swelling it varies with the nature and amount of the exudate in the early stages The greater the amount the greater the tension is likely to be and so also the harder the consistency and the greater the pain In streptococcal infections the exudate remains fluid in staphylococcal infections it tends to coagulate Streptococcal exudates may be very hard because of the tension and this means a very acute inflammatory reaction and excessive pain Staphylococcal exudates may also be hard, but this may be due to coagulation In this event they are not necessarily very painful The observation is an important one In streptococcal exudates there is commonly marked and easily shown pitting oedema In staphylococcal exudates the pitting is still demonstrable but it is not so easily or gently elicited

In the later stages of inflammatory swellings the consistency will vary with the termination of the inflammation Fibrosis is likely to lead to a hard swelling the harder the more the fibrous tissue and the more fully developed it is A final calcification will produce a stony hard swelling Partial or total destruction resulting in suppuration and sloughing will produce softening and fluctuation and ultimately discharge

In the case of neoplasms several features control the consistency, e g , the structure, the rate of growth, degeneration and the tendency to cure

The structure varies from semifluid myxomatous or fatty tissue to bone and consequently the consistency may vary from fluctuant or semifluctuant through all grades of softness, elasticity and hardness up to that of stone depending on whether the tumour is a lymph angioma haemangioma myxoma lipoma, fibroma (soft or hard), chondroma osteoma etc

The rate of growth affects the tension in the tumour the more rapidly growing the more tense and harder the swelling and usually the more the likelihood of pain

Degeneration is usually associated with a tendency to disintegration and accompanied by softening and even liquefaction of tissue This gives rise to a softer consistency possibly even fluctuation As the degeneration is not likely to involve the whole of the tumour it results in a variation of the consistency in different parts of the swelling

The tendency to cure in neoplasms is usually shown by the development of fibrosis or calcification Fibrosis leads to a hardening of the swelling and as contraction increases the hardness may become stony

as met so regularly in the scirrhous type of carcinoma Calcification when it occurs, gives rise to the hardest consistency possible, all elasticity disappearing Compressibility of a swelling is important as it indicates that part of the contents or substance can be displaced from the swelling itself It is mostly met in vascular and fluid swellings, with an outlet for the fluid content, but is also seen in any type of reducible hernia

Translucency is a test, frequently employed which combines inspection and palpation, as manipulation has often to be employed to get the best results It consists in the passage of light through a swelling usually most easily obtained in darkened surroundings It is only likely to be successful when the swelling contains clear, more or less colourless fluid, or, occasionally, gas

Surface The surface must be palpated as a whole and in detail

Inflammatory swellings especially when more or less acute, early and due to exudate tend to be smooth both as a whole and in detail As the exudate is absorbed and individual parts may exhibit differing pathology e g, abscess formation, the surface as a whole may become irregular but the irregularities have each a smooth surface In the case of chronic inflammatory swellings, where cellular changes are chiefly responsible, and the so called granulomatous development takes place the surface as a whole is irregular, but the separate nodules usually have a smooth surface

In simple neoplasms there is often a tendency to lobulation in their growth typically seen in lipomata, and in these the surface as a whole may also be irregular, but that of the individual lobules is smooth

Of the malignant tumours the sarcomata tending as they do to distend the tissue and form an imperfect capsule present a similar state of affairs to that described above i e the surface as a whole is irregular and lobulated but the surface of the lobules is smooth The rate of growth is the usual outstanding differential point in these cases

The carcinomata however present a generally irregular surface and on close examination the surface in detail is also irregular, due to the tendency to infiltration at every part of their periphery without even an imperfect capsule recognizable as such It is this process which has given the idea of cancer roots to the layman

Edge It is customary to speak of the edge of a swelling as being well or ill defined

In inflammatory swellings especially the more acute early ones, when the exudate is infiltrating the tissues from the focus the edge may be very ill defined and may shelve insensibly into normal tissue As however the exudate later becomes increasingly absorbed, the localisation of the focus becomes more marked and the edge therefore tends to become more and more clearly defined

In the case of chronic inflammatory swellings where the cellular

changes account for the greatest part the edge tends to be better defined the earlier the stage and it is only when the infection has infiltrated the surrounding tissues that the edge becomes less well defined

In the case of the neoplasms, it is usual to regard the simple tumours as having a perfect capsule and, therefore a thoroughly well defined edge It is sometimes so well defined that it is described as slipping the best example being the ordinary lipoma where the tumour appears to squirt away from under the finger The fact however, that so many of the simple tumours may appear in diffuse form without any capsule at all necessitates a modification of this accepted opinion as in the diffuse forms the edge is as ill defined as it is possible to be In sarcomata as has already been described, there is a tendency to capsule formation however imperfect, with continued growth and consequently they often appear to have quite a well defined edge

In the case of the carcinomata this is not as a rule so In the average case infiltration of the surrounding tissue commences at once and continues The result is that it is quite uncommon to get the impression of a really well defined edge and it commonly shelves into the surrounding tissue This may however, be modified for several reasons A small carcinoma at considerable depth e g, in a big breast may appear to have quite a well defined edge as the amount of tissue relative to the tumour and moving over it may mask its detail An encephaloid carcinoma growing very rapidly, may at first present as an apparently well delimited tumour and give the impression of a clearly defined edge A carcinoma too, starting in a previously simple adenoma may at first be indistinguishable as such and only when it infiltrates considerably may it lose its well defined edge This is well seen in the thyroid where quite a high percentage of carcinomas are only diagnosed by the microscope and in the breast, where a carcinoma starting in an intra canalicular fibro adenoma may be impossible of diagnosis as malignant retaining as it does the very well defined edge

Relation to Surrounding Parts This again, is of the greatest possible importance both from a diagnostic and a prognostic point of view

Skin As the result of an underlying swelling the skin may be either stretched or infiltrated

Stretching may be present in any type of swelling and it is only of importance if the pressure is sufficient to interfere with the blood supply and so predispose to ulceration This is only likely to occur in the more rapidly growing tumours such as sarcoma

Infiltration may be either inflammatory or malignant causes thickening and it can be felt Inflammatory infiltration due to exudate usually pits on pressure, and is evenly distributed in the affected area Neoplastic infiltration implies the spread of the cells of the growth into the skin and with this the skin gradually becomes incorporated in the

tumour It usually occurs where the growth approximates most closely to the surface, and is apt to be uneven in feel, and may take place at more than one point As opposed to this cellular infiltration and before it actually occurs the extension towards the surface is apt to involve and block the skin lymphatics, and when this takes place marked thickening results from lymphatic oedema giving rise to the pig skin appearance already described Frequently in these cases thickening and firmness can be felt outside the pig skin area, indicating further lymphatic blocking in the adjacent subcutaneous tissue

Muscles In the case of extrinsic swellings the muscles may be involved by extension to the sheath or into the substance of the muscle belly It may occur in both inflammatory and neoplastic cases in the latter essentially in malignancy The indication is the fixation of the swelling in the length of the muscle fibres, when contraction occurs The swelling however, will still be able to move across the fibres It is often rendered more prominent by the muscle contraction Where the swelling is an intrinsic one of the muscle it tends to be masked by its contraction and becomes fixed in every direction, though more especially so in the length of the fibres

In other words if a swelling is in the muscle, it is fixed by contraction both in the length of the fibres and across them If it is attached to the muscle it is only fixed by contraction in the length of the fibres If it is unattached to the muscle then it is not fixed in either direction by contraction and will often be better defined and more rapidly dissociated from the muscle when the latter is rendered tense

In the case of breast tumours however should they extend through the pectoral muscles and infiltrate the chest wall itself they become fixed under all circumstances whether the muscle is contracted or not

Deeper Tissues including Blood Vessels and Nerves Valuable information is often obtained from compression displacement or infiltration of these structures Nerves may be irritated at first to be followed by destruction of their function partial or complete in any of the above ways It is often easier to decide whether a blood vessel is compressed displaced or infiltrated especially an artery by investigating the pulsation Simple tumours are likely to compress and displace the vessels whether arteries or veins and do not infiltrate them Inflammatory and malignant swellings are prone to infiltrate and surround them This is especially seen in carcinomas whereas in sarcomas displacement rather than infiltration is likely to occur In any case obstruction of the affected vessels is apt to occur whether they are arteries or veins

Mobility This has been referred to in connection with the muscles of the part but fixity of the swelling will be produced by attachment usually by inflammatory or malignant infiltration to any rigid structure in the neighbourhood Its prognostic significance is especially important

Impulse or Thrill on Coughing This observation has widespread implications In the act of coughing both intra abdominal and intra thoracic pressures are increased, and consequently any cavity connected with these will be affected and distended This is particularly seen in hernias but also in the venous system of the head and neck and in the veins of the lower limb when the proximal valves are incompetent Other examples will suggest themselves While in all cases the impulse is expansile in veins it is accompanied by a fine thrill (Figs 18 20)

Pulsation This may be either transmitted or expansile In transmitted pulsation it comes from arteries outside the swelling and is pushing in character By separating the swelling from the adjacent vessel the pulsation will disappear This can be done by posture (patient on hands and knees when the abdominal aorta is responsible) or manipulation (lifting the swelling away)

An expansile pulsation comes from within the swelling and is due to its marked arterial vascular supply or increase of the contents in the case of a hernial protusion of any sort

PERCUSSION

This is chiefly of value in swellings of the chest and the abdomen, when their resonance or dullness may be of the greatest possible importance At the same time resonance or dullness of the surrounding parts may be equally important Apart from this however in the tissues themselves which are ordinarily dull on percussion, a tympanitic note may be obtained in the presence of gas whether due to surgical emphysema or gas infection

AUSCULTATION

This is most commonly used in the chest A very vascular swelling is likely to produce a bruit, and such is generally present when there is expansile pulsation It is not limited to aneurysms

The foetal heart can be excluded in abdominal swellings Gurgling and splashing may be heard in the abdomen by the stethoscope when it may not be audible to the unaided ear They indicate peristalsis, even though mild in character The observation is especially important if there is a question of paralysis of the gut or ileus

EVIDENCE OF DISSEMINATION

In inflammatory swellings the cause is usually an organism and dissemination refers to the organism inflammation possibly following at any site of its arrest Simple tumours do not disseminate but the cells of malignant tumours whether sarcoma or carcinoma are prone to do so



Fig 18 *a* and *b* Expansile [illegible] pulse on forced expiration Tuberculous abscess communicating with cavity deep to deep fascia



Fig 19 *a* and *b* Expansile impulse on forced expiration. Substernal sequestration dermoid



Fig 20 *a* and *b* Expansile impulse on forced expiration Inguinal hernia

In all cases dissemination occurs by continuity of tissue contiguity of tissue lymphatics and blood stream and evidence of its having taken place by any of these methods should be looked for

SPECIAL EXAMINATION

Special investigations may be required when a swelling is found to be in relation to any of the orifices e g, mouth (involving the throat larynx and bronchi oesophagus and stomach) nose the anus uretha and vagina Two methods may be employed (*a*) by endoscopy, i e by the use of the various scopes and (*b*) by radiography, with the use of radio opaque substances e g, barium meal cholecystogram, pyelo gram bronchogram etc In addition the pleural and peritoneal cavities may also be endoscoped with the help of air introduction

SCHEME V

ABDOMINAL EMERGENCIES
SPECIAL FEATURES

The term includes all those acute conditions arising in the abdomen and consequently covers a greatly varying pathology e g , injuries with haemorrhage or perforation obstructions in the various hollow muscular systems, infections with inflammation etc Many of the conditions are so serious as to be a matter of life and death and as such require urgent attention

HISTORY PRESENT CONDITION

Pain

This is usually by far the most urgent complaint

Onset A warning may or may not be given that an emergency is threatening

A purely mechanical condition e g , obstruction due to a stone or a twist, as a rule gives no warning conditions due to infection and inflammation, on the other hand usually do

Circumstances of Onset The time of day and what the patient was doing at that time are important

Many of the mechanical conditions depend upon activity, either of the body as a whole or locally while infective and inflammatory conditions have no relation to it but come on while the patient is at rest General activity as a cause is frequently seen in urinary calculi where jolting may move the stone so that it blocks the pelvic outlet or the internal meatus This commonly occurs during the day Local activity as a cause is seen in the secreting glands and their associated sacs and ducts A gall stone is likely to be carried into the neck of the gall bladder or cystic duct by the flow of bile during the act of evacu ation a sudden obstruction resulting without warning This may occur in the early part of the night 2 3 hours after the last meal

On the other hand where cholecystitis arises in the absence of a stone there is usually a warning that something is wrong for about 3 days before anything serious occurs Frequently an emergency arises as complete obstruction of the outlet may develop from oedema the result of the progress of the inflammation

In appendicitis the ordinary attack is ushered in with a bellyache, often quite mild and starting at night, for a day or two but if a stricture is present with obstruction and a stercolith the attack may commence quite suddenly In perforating ulcer the emergency is of the most dramatically sudden occurrence In the great majority of cases however, there is an old story of ulcer, and warning of the possibility is frequently given either by a recent recrudescence of symptoms, or the development of local pain and tenderness The perforation usually takes place during the day when the patient is actively occupied

Situation The site at which the pain is felt is very important and the patient is often very indefinite about it It is well to try to get him or her to put the tip of a single finger on the spot, though this may be impossible

The pain may be local at the site of trouble or referred, and this also is a most important point to decide The pathology entailed is quite different in the two cases Where the parietal peritoneum is irritated the pain is felt at the site of irritation e g, in peritonitis and it is increased by pressure Where pain is due to tension in one of the hollow muscular viscera and there is no irritation of the adjacent parietal peritoneum it is referred in the distribution of the somatic segments corresponding to the viscus It is therefore, not at the site of trouble and may be a considerable distance away It is relieved by pressure i e, over the site of pain, but not over the affected viscus, where pressure increases the tension and so the pain A correct assessment here is invaluable in gauging the pathology

A good example is seen in the ordinary attack of acute appendicitis The early pain due to intra visceral tension is felt about the umbilicus and relieved by pressure at that site, the later pain is felt in the right iliac fossa, in the region of the peritonitis which has developed and is increased by pressure

In the case of referred pain, temporary relief is usually obtained by a novocain injection at the referred site

Nature The type of pain depends upon its cause It may be continuous or intermittent and if continuous it may or may not be of the same intensity all the time Anything which gives rise to parietal peritoneal irritation e g haemorrhage extravasation, infection will give rise to a continuous pain of lancinating type of great intensity Anything which causes increased parietal irritation will increase the pain and the increases are sharp and knife like or stab like i e so called lancinating

In the upper abdomen, where the respiratory movements are more noticeable the peritonitic pain may be increased with respiration, and simulate a pleurisy In any part of the abdomen peristalsis may be responsible for increasing the pain by causing friction between the gut and the parietal peritoneum

Complete obstructions, with permanent increased tension also give a continuous pain, but it is not of even intensity From time to time and the intervals vary in the different hollow muscular systems, there is an exacerbation, and this is indicative of peristalsis taking place

Where obstruction is not complete, as a rule there is no continuous pain but that felt is intermittent and is due to the peristaltic waves of extra force

Twisting or pulling on the mesentery of the gut or attachment of other viscera, e g , the ovary, also gives rise to a continuous pain often of a sickening character The term colic is often used by the patient to describe his pain, but one must know exactly what he means by it as he frequently employs it inclusively and indiscriminately True colic refers to the intermittent pain of excessive peristalsis or its equivalent in the hollow muscular systems, and is, therefore quite a special type of abdominal pain carrying with it quite definite implications

Suddenness of Onset This is bound up with the circumstances of onset and has been partially dealt with under that heading The pain which justifies the term emergency and is usually responsible for it, is usually a sudden severe one occurring with or without warning If a warning be given the period covering it is not as a rule regarded by the patient as part of the emergency, and it is commonly only on going carefully into the history that information of it is obtained The patient may, therefore regard the condition as having started suddenly or gradually Purely mechanical conditions e g , stone obstructions and torsions usually commence quite suddenly without warning Purely inflammatory conditions e g cholecystitis or appendicitis usually commence with a warning of 2 or 3 days

When mechanical and inflammatory conditions are both present it depends on whether the mechanical or the inflammatory element is the primary exciting cause of the emergency whether there is warning or not and whether, therefore it is regarded as beginning suddenly or gradually In the case of complete obstruction of the hollow muscular system with or without inflammation, tension gangrene and perforation are likely to occur and if there has been any reason for not calling the condition an emergency up to that time when perforation and extravasation occur as a rule there is no further doubt that an emergency has arisen with an appropriate amount of pain Suddenness of onset without warning suggests something purely mechanical The absence of this suggests inflammation

Severity Whatever the cause of the emergency the pain is usually of the severest possible nature

The common standard of severity of pain in women is that of labour, and any pain that approaches that level is regarded as about as bad as one should be called upon to bear All the obstructive pains are similar to this and can be compared with it

While the pain of parietal peritoneal irritation is quite a different type its effect can be assessed fairly well by women who have borne children It is quite often described as a deadly pain the patient feeling that unless relief is given death must take place The twists and mesenteric pulls give a pain of comparable intensity though again different in type

In the case of men, who have no physiological standard of pain and who seem to think perhaps in consequence that they ought to be free from it as a rule they tolerate it much less well than women and it may be difficult to gauge its severity from their description which tends to be exaggerated In practice it is often best to judge by its effect on them as observed by onlookers If the pain has knocked him com pletely out so that he looks really ill grey and drawn and sweating profusely the pain can be regarded as a severe one

Persistence Persistence of the pain means a persistence of the cause of it whether it is in the nature of a partial or complete obstruction an inflammatory condition in the hollow muscular system or in the peritoneal cavity or a twist etc

Relief of the pain usually means that the underlying condition has been relieved but there are some pitfalls which may deceive not only the patient but the medical attendant as well

(*a*) In inflammation and obstruction of the hollow muscular systems tension gangrene may result in partial or complete destruction of the wall If the wall be completely destroyed the nerves are included and all pain may cease though the condition is not relieved At this stage no peritonitis has developed Both the patient and the doctor may think he is cured but he is on the verge of disaster since the viscus will burst and a diffuse peritonitis result This is a frequent cause of death in appendicitis through the diagnosis being missed

(*b*) Where peritonitis has occurred involving the parietal serous membrane the pain may be relieved by the exudation of fluid between the parietal and visceral peritoneum This is exactly the same as occurs in pleurisy It does not necessarily mean that the condition has improved It occurs much more easily in the pleural cavity with a single and simple lung surface

(*c*) When paralysis of the gut takes place as may happen in peri tonitis the pain produced or exaggerated by peristalsis is relieved but a more serious position has arisen Unfortunately from the point of view of relief of pain this does not readily happen as the peritonitis is rarely sufficiently widely distributed to involve all the gut so that some portions may continue to show peristalsis On the other hand the paralysis of even a limited portion of the bowel may result in obstruc tion It is important to be aware of these possibilities

Change of Situation This is of particular note in the case of obstruc

tion and inflammation of the hollow muscular systems As has been described the early pain is due to increased tension, either intra mural or intra luminal and is referred to the points of maximum intensity chiefly at the front but possible also at the back of the somatic segments corresponding to the particular viscus e g gall bladder the tip of the ninth costal cartilage and just below the inferior angle of the scapula appendix and small intestine the region of the umbilicus distal colon, the hypogastrium and so on This implies that the mis chief is still inside the affected viscus When however, the pain changes to the site of the viscus itself, it indicates involvement of the parietal peritoneum overlying it and means, therefore that infection has spread through the wall either by continuity of tissue or actual rupture This is of course, an extremely serious complication adding very greatly to the gravity of the situation

A further change in situation takes place in a spreading peritonitis and it is of first importance to recognize it, as again it indicates a progressively serious state of affairs This extension is easy to gauge as the pain and other evidences follow closely the parietal peritoneal involvement It is well seen in the extension down the right paracolic gutter in cases of ruptured duodenal ulcer, which may lead to the mis taken diagnosis of acute appendicitis and spread up both paracolic gutters in pelvic appendicitis with peritonitis

Change of Character This has also already been referred to in con nection with some of the above points The ch ef change noted is that which takes place when the referred pain of colicky type due to increased intravisceral tension is altered by the development of peritonitis leading to the severe local lancinating type of pain The pathology is readily appreciated if the change of character is understood

Apart from the question of pain one is able to obtain most of one s information about abdominal conditions from a consideration of the various orifices communicating with the abdomen viz the mouth anus urethra and vagina

VOMITING

Vomiting is regarded by most clinicians as a cardinal symptom but compared with pain as such it is much less reliable While a very small proportion of patients may appear to have a very blunted sensitivity to pain and to that extent may vitiate the value of the history, a very much larger proportion of individuals either vomit with difficulty or not at all and it is essential to know this as by the passage of a stomach tube one may get the same information as is given by the ordinary vomiting patient and that information can be very important

Type of Vomiting Vomiting may be voluntary or involuntary but in abdominal emergencies it is mostly of the latter type Voluntary

vomiting is usually indulged in not because the patient requires to vomit but because he has some feeling which he thinks might be relieved by vomiting or which has previously been relieved by it Aids to it are the introduction of the finger to the back of the throat or a preliminary repeated swallowing of air followed by expulsive efforts

Involuntary vomiting on the other hand is *commonly the result* of pain or nausea or both combined Average vomiting is carried out with a certain amount of effort and the abdominal contractions associated with it lead to the stomach contents being expelled with a certain amount of force *Projectile vomiting is the term applied to very forceful* evacuation of stomach contents which in some cases might be described as explosive the vomitus being capable of projection several feet This is commonly seen in obstructive conditions e g, pyloric stenosis when, *in addition* to the patient s effort the evacuation is aided by the hypertrophy of the stomach wall In toxic cases especially in peritonitis, with gross depletion of the patient s condition the vomitus may continuously or at very frequent intervals, seem to well up into the mouth and overflow at the angles Furthermore this appears to take place with little or no effort on the part of the patient indeed it is often described as effortless

Quantity Vomiting occurs in greatest quantity in acute intestinal obstruction especially a high obstruction It is usually both urgent and copious even though the patient may be taking nothing by the mouth As a result the patient rapidly becomes dehydrated and loses blood chloride at the same time Compare that with obstruction of the sigmoid colon, where vomiting if it occurs, will take 4 days or more before it begins, and then it is not urgent In peritonitis it is not large in amount but is usually very persistent In gall bladder conditions it is likely to be more pronounced than in appendicitis, and in acute pancreatitis it is sometimes very severe

Quality In any case, the first vomitus is sure to be stomach contents though these may vary e g, food blood mucus etc Unless the vomiting is severe it is unlikely to be more than this e g in the ordinary case of acute appendicitis

In gall bladder disease where it is more severe, the stomach contents are likely to be followed by duodenal contents especially bile and there is commonly much eructation of gas associated Naturally if the common bile duct is blocked there will be no bile In acute intestinal obstruction the stomach and the duodenal contents are likely to be followed by the upper jejunal contents which resemble somewhat *cafe au lait* and have a rather unpleasant odour Should the obstruction persist the vomitus is likely to change to brownish faeculent material with a very offensive odour True faecal vomiting is extremely rare except in cases of gastro colic fistula i e the vomiting of formed faeces

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Type of Vomiting Vomiting may be voluntary or involuntary but in abdominal emergencies it is mostly of the latter type Voluntary

In incomplete obstruction of the bowel flatus is passed and as a rule one may say that if the patient can pass flatus he has not got complete obstruction In the early stage however of acute intussusception and volvulus obstruction may not be complete and flatus may be passed

Diarrhoea Diarrhoea may be met with at times in the early stage of abdominal emergencies In intussusception while the patient is still able to pass flatus the vascular obstruction may produce oedema and transudate into the bowel lumen and this may lead to a diarrhoea with mucus and blood

It is important to remember that the intussusception may either follow or precede the diarrhoea but the diarrhoea when present always precedes the complete obstruction In acute appendicitis at least 19 out of 20 cases have constipation but occasionally diarrhoea occurs A child with appendicitis and diarrhoea generally does not vomit while an adult with it usually is suffering from an exceptionally virulent attack and if the diagnosis is missed the outlook is very grave In acute pan creatitis it is not unusual for diarrhoea to be present instead of constipation

Diarrhoea may also be described early in those cases where an acute constipation follows a chronic one especially in the lower colon The patient may have been subject to intermittent diarrhoea and obstruction for some time previously

Early diarrhoea however generally speaking is a very strong point against the condition being a surgical emergency In the later stages of progressive peritonitis diarrhoea is not infrequent Profuse diarrhoea is always much more likely to be medical than surgical

Discharge Mucus pus and blood from the rectum separately or combined may be described by the patient but they are chiefly of importance in relation to the possible antecedents of the emergency However as mentioned blood and muscus may occur in the diarrhoea of early intussusception

The relation of the discharge to the stool is important i e whether it is intimately mixed with it or not In high intesinal lesions where the intestinal contents are fluid the discharge mixes in freely and may be difficult of recognition whereas in the lower part of the colon where the faeces should be formed the discharge remains on the surface If the patient has diarrhoea the discharge will be mixed in the stool wherever the lesion

Arrest of Flatus This has been dealt with under Complete Obstruc tion and one may say both that the complete arrest of flatus, after all attempts to get it to pass have failed almost certainly indicates com plete intestinal obstruction and that the passage of flatus almost certainly indicates the absence of complete obstruction

In complete obstruction the patient often feels that if he could only

Blood, fresh or altered, is not commonly seen in the vomitus in surgical abdominal emergencies It may come from an ulcer varicose veins or a carcinoma of the stomach, but it may also arise from abrasions or ulcers of the mucous membrane so tiny as to be recog nized with difficulty or missed altogether In acute pancreatitis there is sometimes much altered blood in the vomitus

Points to remember are that an ulcer of the stomach and the duode num that is likely to perforate is very unlikely to bleed at the same time as the pathology is contradictory, while a carcinoma is unlikely to bleed sufficiently at one time to produce an emergency, and it very rarely perforates Both may, however, occasionally occur Most of the profuse haemorrhages which occur from the stomach do not call for surgical interference—at all events as an emergency Profuse haematemesis, especially if painless and single, is much more likely to be medical than surgical but if repeated becomes increasingly likely to be surgical

In the case of a rapidly occurring haematemesis, a large part of the vomited blood is likely to be unchanged whereas in a more slowly occurring and smaller haemorrhage as in the case of carcinoma or acute pancreatitis it is usually considerably altered and is described as coffee ground vomit

Frequency In obstruction the vomiting is likely to last as long as the obstruction and it is usually frequent and copious In peritonitis vomiting is frequent but in small quantities and is likely to persist until the peritonitis begins to improve In appendicitis early there may be a little vomiting on 2 or 3 occasions It will then cease and not reappear until peritonitis develops should that be permitted In gall bladders the vomiting is both more frequent and more persistent

In many cases of perforated ulcer duodenal especially no vomiting occurs though there may be one or two bouts at the beginning

In acute Fallopian tube inflammation which is liable to spread into the peritoneum vomiting is likely to be more frequent and persistent than in appendicitis and the same applies to ovarian emergencies

The severe vomiting of gastro enteritis as seen in the local apricot sickness is a strong point against appendicitis which it is sometimes mistaken for

Bowels

Constipation This is the rule in the large majority of abdominal emergencies whether inflammatory or obstructive Absolute consti pation which means the arrest of both faecal matter and flatus is only likely to occur when bowel obstruction is complete In such cases it may be possible to empty the lower bowel of faeces by an enema but flatus is not passed or only a small quantity with the first enema

developed from the bladder base Renal and ureteric colic, therefore are commonly associated with an urgent desire to micturate, just as bladder irritation is The story of the pain and its distribution will be of great help here Apart however from the possible primary involvement of the urinary system it may be involved secondarily in abdominal emergencies and this is most commonly seen in inflammatory conditions developing adjacent to its different parts The commonest by far is the involvement of the back of the bladder in peritonitis affecting Douglas pouch of peritoneum In these cases the symptoms include anything from increased frequency with pain on micturition through hesitancy with pain up to complete retention of urine The patient may give a very clear sequential story like this and its importance in diagnosis cannot be over-estimated A second not uncommon history of secondary involvement may be obtained where the ureter is close to some inflammatory focus e g an acute appendix Here increased desire to micturate with perhaps increased frequency and even the passage of blood may be met While it may be helpful if correctly interpreted it may be very misleading

MENSTRUATION

Any relationship of menstruation or uterine discharge to an abdominal emergency may be of the greatest possible importance and may focus the origin of the mischief It is rare for any emergency, in which a normal uterus and adnexa exist and in which they take no part to exhibit any relationship to the menstrual cycle

In a ruptured ectopic pregnancy there is usually the story of a missed period and a menstrual flow with the occurrence of the emergency In a twisted ovarian tumour apart from the story of an increase in size of the swelling there is commonly a vaginal discharge of blood with the attack

In acute gonorrhoeal salpingitis there is usually a purulent vaginal discharge but in the more chronic cases possibly with an exacerbation there is often a story of menorrhagia and perhaps intermenstrual discharge

HERNIA

The possibility of a hernia being the cause of an abdominal emergency is too great to be ignored and so far as the patient is concerned he may be able to give important information This is particularly so if he has known a hernia to be present previously since for it to be the cause of the emergency some important complication must have arisen and he will probably have noticed if any change has taken place in it e g pain increased size hardness or irreducibility

pass flatus he would be all right The desire to do so is there, but the power to effect it is absent

Increased Peristalsis The patient may be able to give quite definite information of this when it is present It is especially likely to be *recognized by him when the bowel is already hypertrophied and where* the contractions will be much more pronounced than those normally taking place especially, therefore, where there has been a chronic partial obstruction present previously In other words, a primary acute obstruction is much less likely to present the patient with the evidence we look for than an acute obstruction developing on a previously chronic one

The evidence we may anticipate is visible, audible or palpable The visible evidence is normally described by the patient as the occurrence of lumps from time to time in the abdomen, i e, lumps that come and go in some cases always in the same region, in other cases varying in their situation This varying situation is controlled by the portion of bowel affected, the mobile small intestine permitting of lumps anywhere in the front region of the abdomen the fixed portions of the colon determining the site of the corresponding contracting part

These visible lumps are associated with rumblings of gas, which may be very loud, especially where chronic obstruction has been present for some time, and in these cases they are often the most noticeable feature so far as the patient is concerned In a primary acute obstruction as a rule the patient notices none of them They are due to the peristaltic waves squirting along the liquid and gaseous contents of the bowel If the patient is able to indicate the site of arrest of the borborygmi especially if this is constant it may constitute a strong suggestion of the actual site of the obstruction

The visible lumps can also at the same time be felt and they are quite hard due to the firm contraction of the bowel wall As the contraction passes off they are no longer palpable

A point that is well worth keeping in mind is that in very thin patients whether normally so or due to emaciation the normal bowel movements may be readily seen and they must not be wrongly interpreted In primary acute obstruction none of the evidences of increased peristalsis may be registrable especially so far as the patient is concerned and his failure to record them does not necessarily mean that they are absent

Micturition

Should the patient observe any disturbance of micturition in relation to the abdominal emergency it is likely to be an increased desire to pass urine with a corresponding increased frequency This is met where the renal pelvis ureter or urinary bladder is the seat of trouble and it is explained on a developmental basis as the pelvis and ureter are

developed from the bladder base Renal and ureteric colic therefore, are commonly associated with an urgent desire to micturate just as bladder irritation is The story of the pain and its distribution will be of great help here Apart however from the possible primary involvement of the urinary system it may be involved secondarily in abdominal emergencies and this is most commonly seen in inflammatory conditions developing adjacent to its different parts The commonest by far is the involvement of the back of the bladder in peritonitis affecting Douglas pouch of peritoneum In these cases the symptoms include anything from increased frequency with pain on micturition through hesitancy with pain up to complete retention of urine The patient may give a very clear sequential story like this and its importance in diagnosis cannot be over-estimated A second not uncommon history of secondary involvement may be obtained where the ureter is close to some inflammatory focus e g an acute appendix Here increased desire to micturate with perhaps increased frequency and even the passage of blood may be met While it may be helpful if correctly interpreted it may be very misleading

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Other Swellings

If a swelling has been noticed in the abdomen, and this is much commoner in women, it is important to know whether any change has taken place in it, with the development of the emergency

Ovarian cysts, with torsion, increase in size and become painful and the thinner patients often observe this Fibroids of the uterus may also twist with a corresponding change in size, but they may also undergo degeneration and this too, may show itself to the patient as an increase in size with the development of pain and tenderness

PREVIOUS HISTORY

Previous attacks of a similar nature are quite frequent in the history of abdominal emergencies Attacks of infection with inflammation, e g the appendix gall bladder pancreas attacks due to calculi, e g, gall stones torsions of all sorts e g gut ovarian tumour obstruction of gut e g intussusception may all have had one or many previous seizures Evidence of chronic intestinal obstruction may be forthcoming previous to the occurrence of an acute complete attack A previous history of ulcer symptoms will probably be obtainable in cases of ruptured ulcer

PHYSICAL EXAMINATION GENERAL

Facies The facial appearance of the patient is of the great possible importance The first point to decide is whether he really looks ill It is very difficult for a patient to assume the facial appearance of serious illness and it is equally difficult for a patient who is seriously ill to mask it

As has been mentioned the lower part of the face appears chiefly to register the pain Surgical abdominal emergencies rarely have a headache

The face may be pallid due to shock or haemorrhage the shock being usually a more speedy cause of it The cheeks and eyes may be sunken This is also seen early in shock and haemorrhage but later it may occur in severe toxaemia e g diffuse peritonitis In such a case there is often some cyanosis from heart failure whereas in shock and haemorrhage there is pallor Cyanosis may be noted most commonly due to muscular rigidity of the abdominal wall restricting respiration or possibly distension interfering with the diaphragm In any late case it may result from cardiac failure It may be seen temporarily during the extreme pain of the attacks of colic from voluntary rigidity

A flushed face is seen in the straightforward inflammatory conditions and this includes the non surgical emergencies e g gastro enteritis etc Suffusion of the conjunctivae is usually only seen in the more marked fevers of the medical cases

ıraemic cases not infrequently admitted as intestinal obstruction
ce presents the sallow appearance of that condition suggesting a
re of anaemia and very mild jaundice and there is usually a marked
ss of expression though there may be a considerable degree of
sness

ndice may be observed but in obstructive cases it takes 24 hours
to develop In non surgical cases it may be present when the
it first calls attention to himself

presence of herpes labialis may be significant It is by no means
ıon in abdominal emergencies but is a regular accompaniment of
nococcal infections in this case a pneumococcal peritonitis usually
n female children

aviour The patient may lie very quiet or throw himself about
the deadly pain of parietal serous involvement in which any
ment increases it he usually keep absolutely dead still and is
l to move at all The involuntary muscular rigidity accompanying
ıports this attitude

the case of pain due to intra visceral tension in the hollow muscular
ns the behaviour is exactly the reverse Even where obstruction
mplete and the pain continuous there are in addition the waves
ristaltic contraction each wave occurring in a crescendo to maximal
ity and causing the patient to writhe and throw himself about
e same time doubling himself up to produce pressure at the site
e the pain is felt As the pain is of the referred type this pressure
to relieve it

tcries The patient may be lying quite quietly and then suddenly
ıut This is the result of a sudden attack of pain or an exacerbation
ain already present It is the usual thing in obstruction of hollow
ular systems and usually indicates it On the other hand it does
commonly occur in serous membrane pain as the patient is usually
nsible for the movements which may produce it and so he
ıously avoids permitting anything that will lead to it It is especially
ounced in children who usually make no effort to control or
ess it

e general examination must be completed by investigation of the
erature pulse etc as before indications of shock haemorrhage
epsis particularly being noted

PHYSICAL EXAMINATION LOCAL

INSPECTION

ual Sites These are so important in relation to abdominal emer
ıes that they are mentioned first to emphasize the association
rangulated hernia must always be looked for wherever obstruction

When the parietal peritoneum becomes involved the pain tenderness and rigidity are all found at the same spot viz the site of irritation and the extent of them all varies with the extent of parietal peritoneum involved

At a later stage still the parietal peritoneal irritation may be relieved by the interposition of inflammatory exudate and pain tenderness and rigidity may all be relieved *to a varying extent often giving rise to a* false impression that the condition itself has improved The degree of rigidity is controlled in great measure by the acuteness of the con dition and the nervous character of the patient being increasingly marked in the more highly nervous and fearful type of person

When e g sudden irritation of the parietal peritoneum occurs, the rigidity may be extreme as seen in ruptured ulcers where it is board like In appendicitis and cholecystitis where there may be a gradual extension of infection and inflammation through the wall to the adjacent peritoneum rigidity develops but as a rule it does not compare with that following rupture if the extravasated contents are free

Clinically in cases of diffuse peritonitis the relation of distension to rigidity is important from a prognostic point of view When dis tension and rigidity are both present the outlook is always more serious than when either is present alone

Mass If a mass be present then it must be investigated according to routine viz its consistency surface edge and relations, and usually the thinner the patient is and the easier he is to examine the more the detail obtained The relations include its position relation to gut and to respiration and its mobility Under Inspection reference was made to visibly increased peristalsis and in the History note was taken of the patient possibly feeling the contractions of the bowel

In palpating for a mass the clinician particularly if he has seen increased peristalsis will naturally try to confirm this by feeling the contracted bowel Just as the visible peristalsis comes and goes so do the masses of contracted gut and a lump which is present one minute is gone the next

The situation usually gives an indication of its origin but may not always do so An ovarian cyst varies in its position according to its size and the length of its pedicle A gall bladder may be felt in the right iliac fossa Usually a renal swelling is felt in the loin but it may be in the pelvis These are however exceptional cases

The relation of the gut to the swelling may also suggest its origin and site e g whether intra or extra peritoneal In an ovarian tumour the gut is usually found round its periphery and rarely in front of it

Respiratory movements usually only occur in swellings in the upper abdomen which are mobile It entails direct or indirect contact with the diaphragm i e while anything in direct contact with the diaphragm

will automatically move with the diaphragmatic excursions, those which are separated from it by solid organs like the liver and spleen, will also move with respiration but are pushed down by the liver or spleen as the case may be This applies, e g, to some growths of the hepatic or splenic flexures of the colon and some gastric and renal swellings Pancreatic swellings do not usually move with respiration because of their extensive retro peritoneal fixity Occasionally what appears to be movement of the swelling with respiration is actually produced by the lifting up of the costal margin away from the lump It occurs especially in emphysematous chests

The question of mobility of the mass is also important Inflammatory masses tend to become fixed early while neoplastic ones only fix late, *due to some complication e g, inflammation or infiltration A point* of importance is whether, if the patient has previously been aware of the mass it has altered with the attack, especially whether it has increased in size This was mentioned in connection with torsion of an ovarian tumour but the same applies to the torsion of any other structure, e g testis fibroid of the uterus As a result of vascular interference commencing with venous block, the twisted tissue becomes engorged with *blood oedematous and often shows more or less extensive haemorrhages*

The Hernial Sites No examination of any case of abdominal emergency especially if there be any doubt as to its nature, is complete without an investigation of the hernial sites as hernias are so fruitful a source of these catastrophes

Attention has been drawn to them under ' Inspection but palpation assumes an added importance from the fact that they may be felt when they are not visible especially femoral hernias An obturator hernia however is almost impossible of diagnosis before the abdomen is opened

Rectal Examination This also should never be omitted unless the diagnosis is obvious without it Nothing is more dreadful than to find a carcinoma of the rectum after opening the abdomen as especially where an acute obstruction has supervened a general abdominal exploration may be the last thing to be desired

Pelvic conditions of various types may only be recognised in this way e g a pelvic appendicitis an extra rectal mass etc

Vaginal Examination Here again this may be an essential part of the examination where there is any question of involvement of the uterus or adnexa

PERCUSSION

The relation of the gut to any mass that may be present is an important observation

The position of an appendix abscess may be determined in this way i e whether it is sub caecal extra caecal, retro-caecal retro colic

pelvic etc and if this can be decided it simplifies very much the operation which may be necessary

In the average ovarian tumour there is a hypogastric area of dullness with surrounding resonance due to the gut the upper border of the dullness being crescentic with the convexity upwards

In the case of free fluid in the abdomen the gut floats on top and in consequence the resonant area obtained has a convexity downwards

Kidney tumours are dull laterally, but usually resonant medially from the overlying colon The enlarged gall bladder is usually dull as it lies immediately behind the belly wall and the dullness is continuous with that of the liver

A carcinoma of the stomach is not usually dull as it has a lumen with gas in it

Free fluid means that it can move its position with the varying posture of the patient Lying on his back both loins are usually dull and if the quantity is large the hypogastrium also and it is in these cases where the dullness in front presents an upper crescentic margin. On turning the patient on to one or other side the fluid gravitates to that side leaving the upper loin resonant This takes some little time to occur and the clinician must therefore be patient If the fluid is loculated by adhesions the dull area remains unchanged by alterations in posture A fluid thrill or wave may be obtained with free non loculated fluid by placing the flat of one hand over one side of the abdomen and flicking the other side

Free Gas This is a most important point to be certain of If present it usually means that a hollow gas-containing viscus has perforated It depends chiefly on the absence of liver dullness for its diagnosis though if the quantity is large there may be distension In grossly emphysematous patients and those with a grossly inflated gut the liver dullness may be unobtainable In the diagnosis of free gas, therefore the essential point is the absence of liver dullness which was known previously to be present

AUSCULTATION

This is as a rule, of limited value but none the less it may be of importance at times While the loud borborygmi of intestinal obstruction especially chronic or acute superimposed on chronic may be readily audible without assistance it may be of importance to be sure that peristalsis is taking place at all The normal contractions give rise to small gurgling sounds which may only be audible with a stethoscope and the importance of them may be to establish the absence of paralysis of the gut which might have been considered possible either from ileus or peritonitis In the primary acute obstructions, no borborygmi may be heard with the unaided ear but they may be very obvious with a stethoscope

Pregnancy may have to be ruled out by recognizing the foetal heart while auscultation helps greatly in establishing the diagnosis of aneurysm

SPECIAL EXAMINATION

Stomach Lavage This is particularly of value from the point of view of diagnosis, in those patients who do not vomit, when as has been mentioned above the same information may be obtained as in those patients who vomit and themselves produce the gastric and possibly the intestinal contents

The nature and amount of the stomach contents is noted

Enema The first point to be noted is the amount the patient can tolerate before he has to return it If the quantity is large 2 3 pints or more it gives no indication of the site of a possible obstruction except that it is probably above the sigmoid On the other hand if it is small in amount the height of the obstruction can be gauged by the amount When the obstruction is low perhaps just out of reach of the finger the fluid returns almost at once, or after putting in one or two ounces and it is usually described by saying that the patient cannot retain it Sometimes if the patient is very dehydrated he may retain altogether repeated large enemata The chief result of the enema is usually to note whether flatus is passed when it is returned As it is mainly in cases of suspected obstruction that enemata are given, the absence of flatus may necessitate the giving of a further one to make certain of it As has been mentioned the first enema may clear the lower bowel and there may be a small amount of flatus with that but if there is a doubt of the result the enema should be repeated

In the early stages of intussusception and volvulus some flatus may be passed This requires very careful watching and judgment

Catheter Where the possibility of the emergency being urological arises the passage of a catheter is necessary The question of blood in the urine usually comes up first from a possible ruptured kidney or bladder Blood from the kidney is mixed evenly and intimately with the urine while this is not the case when it comes from the bladder itself

When the possibility of ruptured bladder is suggested it is customary to empty the bladder by catheter then introduce 10 15 ounces of boracic lotion and finally drain off the bladder contents If less is returned than was introduced it indicates a rupture of the bladder which requires immediate attention

Radiography A straight film is often of the greatest value in abdominal emergencies particularly in doubtful cases where the patient can take no harm from it The presence of free gas can readily be demonstrated with the patient in the upright position as a layer between the liver and the diaphragm It will naturally not be seen if the patient is flat In sus

pected intestinal obstruction, great help may also be given by the demonstration of distended loops of gut and fluid levels in the various loops from the presence of fluid and gas in them (Figs 21 31)

SOME POINTS IN DIFFERENTIAL DIAGNOSIS

Pneumonia Chest conditions are often sent in as abdominal emergencies usually because the pleural pain is referred to the anterior distribution of the somatic segment involved i e more or less anywhere in the abdomen according to the segment affected The appearance of the patient usually at once draws attention to the chest e g the rapid respirations, often with cyanosis and working alae nasi An examination of the chest is likely to settle the problem

Locomotor Ataxia Particularly as a result of the occurrence of gastric crises which may be attended by acute agonising pain and vomiting a surgical emergency may be suspected The type of pain of girdle character with sharp fleeting stabs is quite unlike any ordinary abdominal pain together with the fact that there may be none at all between the attacks The pupils possibly pin point, fixed or irregular, of Argyll Robertson type together with the absent knee jerks and obvious ataxia will usually settle the diagnosis

Kidney Lesions There are two common kidney conditions to be kept in mind (*a*) chronic uraemia, and (*b*) renal colic Both may be mistaken for abdominal emergencies

(*a*) *Uraemia* The special feature here is usually the resemblance to intestinal obstruction There is unusually marked distension and the obstruction is not complete as shown by the administration of an enema In some cases there may be a marked spasm of the sigmoid, but in some there is little or no pain or colic marked constipation and the distension being the outstanding features Where the distension is painless the condition is in the nature of an ileus whereas with pain there is the marked persistent spasm of a few inches of gut with a resultant mechanical incomplete obstruction

Suspicion is usually readily raised and investigation brings out the usual slow mental reaction the sallow appearance the dry tongue foul breath and thirst Urinary and blood investigation will complete the diagnosis Casts and albumin are likely to be present in the urine

(*b*) *Renal Colic* The attempted passage of a stone produces the same intense colic as is seen in other hollow muscular systems The onset is usually sudden and the pain extreme the patient throwing himself about as in many abdominal emergencies There is frequently marked muscular rigidity on the affected side and the breathing is therefore also very similar to that seen in the abdominal emergencies

The distribution of the pain is important from the loin into the groin and then to the testis and inner side of the thigh—the typical



Fig 21 Acute small gut obstruction Typical display of valvulae conniventes and oblique ladder pattern of peristalsis Gas distension but no fluid levels Fairly early



Fig 22 Acute intestinal ob struction—later Multiple fluid levels The opacities suggest calcified tuberculous mesen teric glands (patient a child) Enlarged glands with band found at operation



Fig 23 Late acute intestinal obstruction Numerous fluid levels The general opacity below suggests free fluid



Fig 24 Imperforate anus (see probe) Gross distension of single loop indicates volvulus of sigmoid (found) Child held upside down



Fig 25 Acute ileo caecal intussusception in a child Barium enema showing cervix like projection (filling defect)



Fig 26 Chronic intussusception straight X ray showing gas in lumen of inverted bowel (top lefthand corner) and distension behind it



Fig 27 *a* and *b* Chronic obstruction due to carcinoma of jejunum Barium meal showing gross dilatation of loop behind obstruction



28



29

Fig 28 Barium enema show ing extensive obstruction of splenic flexure and descending colon due to a large perineph ric abscess

Fig 29 Free gas and a fluid level under right diaphrag matic dome due to ruptured duodenal ulcer



Fig 30 Free gas under left diaphragmatic dome due to perforation of a leather bottle carcinoma of the stomach



Fig 31 Free gas under both diaphragmatic domes

renal radiation The renal pain commences below the last rib whereas abdominal pain, if referred to the back, is nearly all above this level

With the colic there is a desire to micturate and increased frequency of micturition

There may be considerable abdominal distention suggesting intestinal obstruction, but all evidence of this is negative, including the passage of flatus with an enema

Examination of the urine usually settles the diagnosis, blood and desquamated epithelial cells being present as a rule if there is a stone or gravel, and often the crystals of the calculus as well It is well to remember as mentioned above that a ureter, lying adjacent to a focus of inflammation may give the same type of attack and also present blood in the urine In neither case is there necessarily any renal disease and casts are not usually found in the urine

As distension may be present, therefore, with both chronic uraemia and renal colic, they may both be mistaken for intestinal obstruction the uraemia often without colic, though by no means necessarily so the stone definitely with colic of the severest type

SCHEME VI

STOMACH AND DUODENUM SPECIAL FEATURES

Chronic ulcers and carcinoma are chiefly discussed, with a reference for differential purposes to functional disorders

HISTORY PRESENT CONDITION

PAIN

As usual pain is the most common and important complaint It may be sudden cramping or continuous Sudden pain is usually due to spasm and in most cases it is pylorospasm It may be met at the cardiac orifice or in the mid gastric region in the situation of the mid gastric sphincter of the lower animals i e the junction of the cardiac and pyloric portions of the stomach Its various relationships usually serve to place it correctly Cramping or colicky pain is due to peristalsis commonly excessive and may be associated with an ulcer in the stomach or the duodenum It is more usual in the pyloric than the cardiac portion of the stomach Continuous pain is due to continuous or sustained tension and occurs during a period of motor activity It is more usual in the cardiac than the pyloric portion of the stomach

Continuous pain may also be associated with extra activity of the lesion producing infiltration either inflammatory or malignant with extension through the wall and possible involvement of adjacent structures

Severity Making allowance for the difference in tolerance of pain seen in different individuals one may say that the average ulcer pain is not very severe the gastric being usually more so than the duodenal The only really severe pain ordinarily met is that due to pylorospasm accompanying either gastric or duodenal ulcer and due to involvement of the pylorus from either side

Time After Food This is one of the most important relationships of the pain in the diagnosis of the varying conditions In average cases of simple ulcer the time relation to food is constant for that patient, although there may be some variation in similar ulcers in different individuals Many conditions are associated with a variable relationship of the pain to food intake but in the large majority of such cases the

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patient has not got a simple uncomplicated ulcer Such conditions include functional cases appendix and gall bladder dyspepsia chronic gastritis or gastro-duodenitis and carcinoma of the stomach

In simple chronic ulcers also while in the earlier stages the time relationship is constant this feature may be lost (*a*) where a condition of chronic invalidism results with gross deterioration of the patient s general condition (*b*) where the pyloric sphincter becomes involved by continuity and (*c*) where double ulcers are present i e both gastric and duodenal

The time relationship to food intake varies with the situation of the ulcer and in the majority of cases the actual site of the ulcer can be diagnosed and often also the state of its pathology Where in simple ulcers the constant time relationship has been lost it is necessary to get the early history to establish it

The basic stomach as seen from a study of comparative anatomy, is bilocular with a mid gastric sphincter between the cardiac and pyloric portions (Figs 32, 33) The function of the two parts varies in the different animals birds and reptiles for a variety of reasons but in the average animal the cardiac pouch is used as a storage chamber, while the main part of the digestion takes place in the pyloric portion The cardiac pouch receives the meal and passes it as required into the pyloric part For this purpose as is seen in all hollow muscular sacs e g gall and urinary bladders and the rectum a constant pressure is maintained on the contents supplemented by a slow peristalsis usually of mild grade In the pyloric portion on the other hand peristalsis is much more active for the mixing of the food and digestive juices and in certain cases for trituration Finally when it is considered that this process has been sufficiently carried out the contents are then evacuated piece meal into the duodenum Until this is judged due the pylorus remains closed having shut on the swallowing of the food

This programme is carried out though perhaps somewhat imperfectly, in the human stomach The pylorus shuts on the intake of food the cardiac pouch especially fills up with the food and at first there is no contraction at all the reservoir dilating to receive the meal About twenty minutes or so after ingestion the cardiac pouch begins to tone up and pressure is exerted towards the pylorus Peristalsis then commences in the pyloric portion and this increases in intensity to be maximal as a rule in about an hour Finally as digestion proceeds the pylorus opens to permit the passage of the gastric contents and the duodenal influx steadily increases to reach a maximum in 2 3 hours depending on the size and nature of the meal

As ulcer pain is due to tension intra mural or intra luminal as in any other hollow muscular system pain is likely to be produced and certainly will be most severe when the tension is maximal Consequently

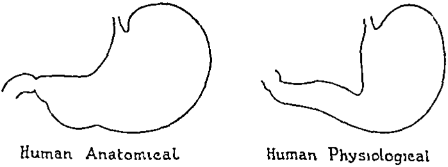


Fig 32 *a* and *b* Diagrams c
the human stomach (*a*) Ana
tomical (*b*) Physiological Mid
ga tric sphincter is indicate
by double dotted lines

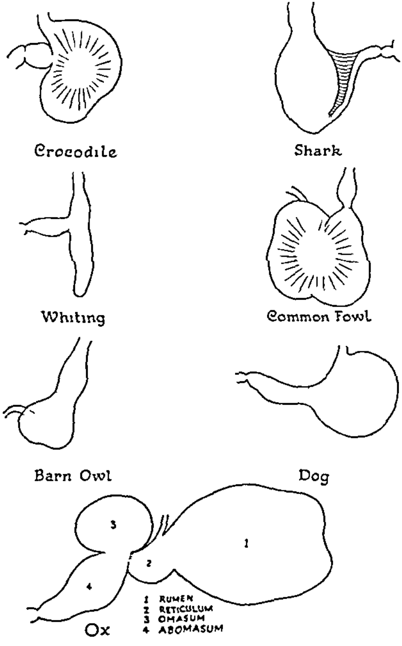


Fig 33 *Diagrams of the com*
parative anatomy of the
stomach The mid gastric
sphincter (constant) is indi-
cated by double dotted lines.

An interesting condition, which is outside the scope of the present consideration, is regurgitation of food into the mouth, usually when it has been ingested too rapidly, in too great a quantity and with too little mastication This bears a close relationship to rumination or chewing the cud

Situation This is a question of segmental distribution, the stomach and upper part of the duodenum covering 6-9 dorsal segments of the cord The pain of gastric ulcers is normally felt between the umbilicus and ensiform cartilage while that of duodenal ulcers is just above the level of the umbilicus This relates to referred pain, but one has to keep in mind that extension of the process, whether inflammatory or malig nant with infiltration and involvement of surrounding tissues may give rise to a local pain as well, depending on the position

Is any Pain present when the Stomach is Empty? The stomach is never empty during the day except before breakfast if the individual is taking three average meals It takes six hours to empty the stomach after an ordinary meal and not only is this interval not usually observed between the heavier meals but there is often a light meal between the heavier ones The result is that the only time we can reasonably guarantee the stomach to be empty is before breakfast

In the early years of a simple ulcer there is no pain when the stomach is empty Superficially, in duodenal ulcers this might appear to be wrong and the so-called hunger pain is usually put down to an empty stomach Nothing could be further from the truth The stomach is still more or less full, and the ingestion of fresh food causes the pylorus to shut Tension is relieved in the duodenum and the pain ceases However in later stages when the patient may be suffering from chronic invalidism any simple ulcer may be associated with pain before breakfast

In a patient with a short history, looking quite well with indigestion and pain before breakfast, one can be fairly certain that no ulcer is present, and that the case is one of functional dyspepsia It is not surgical

Is Pain Relieved or Not by taking Food or Soda? In ulcers high up towards the cardia there may be a few minutes' relief while the stomach is relaxing to take the food but it is often so short that the patient does not regard it as relief and will deny it In ulcers in the pyloric antrum there is often relief for ½ to 1 hour, while in duodenal ulcers the relief is 2 3 hours In pyloric ulcer whether primary or secondary, relief is not obtained at all, and pylorospasm following immediately the intake of food causes immediate severe pain

The taking of alkalies will relieve the pain of any ulcer except those involving the pylorus There are several reasons for this First is the ingestion of the material Secondly, in the case of the carbonates, the acid sets carbon dioxide free which distends the stomach and causes eructation This gets rid both of the CO_2 and the gas already in the

if we consider the average ulcers we can appreciate how the time relationship varies according to their situation In ulcers high up on the lesser curve of the stomach i e, above the mid gastric region and therefore, in the cardiac pouch pain comes on twenty minutes to half an hour after ingestion of food, when the pressure is being strongly exerted towards the pylorus In ulcers on the lesser curvature beyond the mid gastric region i e, the incisura angularis and therefore in the pyloric portion of the stomach, the pain usually comes on about one hour after food ingestion, but may be delayed up to one and a half hours

In primary pyloric ulcers i e, starting in the pyloric canal which are not common the pain occurs in the typical case immediately on the intake of food from pylorospasm, and is much more severe than in the previous types When however, the pylorus becomes involved by the extension of either a gastric or duodenal ulcer, the sudden spasm on the ingestion of food is a new development and it is superimposed on the type of pain that would accompany the uncomplicated ulcer While this may render difficult the elucidation of present symptoms, if the previous story is carefully considered what has taken place can readily be followed, as a rule

Occasionally though by no means regularly with an ulcer exactly at the incisura of the lesser curve this type of sudden spastic pain may also be obtained

Cardiospasm, with ulcers in the region of the cardiac orifice, has not to be considered as the symptom is usually regarded as oesophageal rather than gastric However, an ulcer of the cardiac fundus which encroaches on the cardiac orifice may equally give an early gastric history, followed by the development of cardiospasm

In ulcers of the duodenum pain in the same way as above does not arise till the tension in the duodenum is sufficiently raised and, consequently though food may be entering the duodenum within an hour of ingestion it is only doing so in small quantities and it is commonly 2 3 hours before the quantity passing through the pylorus is just enough to raise the tension sufficiently Naturally the peristalsis of the duodenum itself increases with increased demand, and it becomes maximal when the food arriving is also maximal

A point of importance in relation to the time of pain after food is that while there is a certain amount of latitude in the period for similar ulcers in different individuals the time registered for a particular individual remains constant for that individual e g one patient may get his duodenal ulcer pain two hours after food and another three hours but in the former it will always be two hours for the same sort of food and in the latter always three hours

It is well to bear in mind that water and barium suspension tend to go rapidly through the pylorus seeing that they require no digestion and conditions, therefore are quite different with ordinary meals

to pain when the stomach is empty, but this is not so The time when a patient finds himself ready for the next meal is mostly a question of habit, and it is still the commonest programme to have meals as nearly at four hourly intervals as possible, or, if they are delayed, to have some small snack and a little to drink in the interval Such a pain occurs while the stomach still contains food but it is relieved by taking food, as explained above It is well to remember that these patients until they reach the stage of chronic invalidism, do not have pain before breakfast, when we know the stomach is empty

Night Pain This may simply be the ordinary ulcer pain coming on after a very late meal but, if this be not so, it is usually much later in its appearance than the ordinary pain, and is associated with a chronic penetrating and perforating ulcer most frequently into the pancreas It may be either gastric or duodenal, and when the pancreas is involved the pain is commonly felt in the back as opposed to the ordinary type A chronic anterior perforation on the other hand may give rise to pain in front It is more persistent and boring in type than the usual pain

Appetite

Patients with simple chronic ulcers until they reach the stage of chronic invalidism always have an appetite Their story is that they would eat if they dared

In functional cases in spite of usually looking well the patients insist that they have no appetite at all and do not care if they have food or not Loss of appetite is often the earliest symptom in cases of carcinoma of the stomach

Chronic Invalidism Several references have been made to the stage of chronic invalidism which patients suffering from simple chronic ulcers are liable to pass into after a prolonged period of suffering and particular mention was made of the upsetting effect it has on the manifestations of the pain This has the unpleasant sequel that it may render the correct detailed diagnosis difficult or impossible and often the only way to arrive at a proper appreciation of the pathology will probably be from a consideration of the earliest history To recapitulate the alterations which are likely to occur are

(*a*) the time relationship to food intake is not retained and may be completely upset

(*b*) there is quite often pain before breakfast i e when the stomach is empty

(*c*) the pain is incompletely relieved by vomiting

(*d*) it is incompletely relieved by food or alkalies

(*e*) the appetite is lost

These are more or less all the features of a functional gastric dis turbance and it is essential to discriminate Go back to the earliest

stomach, and the tension is relieved Thirdly, in the case of any alkali the acid gastric contents are neutralised and peristalsis diminishes relieving the tension in the stomach and the rate of evacuation into the duodenum

Air swallowing and subsequent eructation can have the same effect as the taking of carbonate

In functional cases, neither the taking of food nor of alkalies relieves the pain, but, on the other hand, often increases it

Chronic invalidism, resulting from simple ulcer, may alter the response to both food and alkalies and in malignant disease also we do not see the regular or complete relief from either as is noted above

Is the Pain Relieved at once or not by Vomiting? Until the stage of chronic invalidism is reached the pain of all simple ulcers is relieved at once and completely by vomiting The stomach is emptied and all tension is relieved

In carcinoma, as a rule, while there may be some relief it is not complete So often much of the pain is due to infiltration and peritoneal irritation In functional cases habitually vomiting does not relieve the pain and often aggravates it

Is the Pain Relieved or not by Rest in Bed and Dieting? In ordinary simple ulcers in any situation the pain is rapidly relieved by rest in bed and a very light diet especially of liquid Less food is required and less is given and that of an easily digestible nature Consequently there is very little peristalsis required and so very little tension produced Hence if the case is an early one and it is not relieved by rest in bed and strict diet, the condition is functional and not organic A possible carcinoma must be kept in mind If the case is a late one and unrelieved by rest and diet, it is either a carcinoma or has reached the stage of chronic invalidism

Effect of Different Kinds of Food on the Pain The heavier the food as a rule, the worse the pain with all types of ulcer If a drink of water has the same effect it is very much against ulcer at all and in favour of functional disturbance

In gastric ulcers the heavier the food the worse and the earlier the pain in duodenal ulcers, while the pain is worse with heavy food it is usually delayed if observation is made at all Duodenal ulcers commonly occur in the sthenic type of individual with hyperacidity who bolts his food and is disinclined to dwell on himself and so frequently makes poor and casual observations Gastric ulcers on the other hand tend to occur in the asthenic type of individual with low acidity and peristalsis, frequently introspective and therefore much more likely to furnish plenty of detail

Hunger Pain By this is meant that the pain comes on when the patient is ready for the next meal The term might suggest that it is equivalent

In the case of the hour glass stomach, the size of the cardiac pouch will increase as the stricture is nearer to the pylorus It is important to remember that during the period when the obstruction is compensated by hypertrophy of the muscle behind it, there may be nothing to suggest it clinically and it may be first diagnosed by radiology It is when compensation fails and dilatation takes place that the typical picture presents itself In the hour glass constriction the cardiac pouch may be quite large but it rarely reaches the size and capacity resulting from pyloric stenosis Apart from the size the evidences are similar unless, as sometimes happens there is stricture both in the middle of the stomach and at the pylorus when the pyloric pouch also dilates In such a case more especially demonstrated by gastric lavage the cardiac pouch may be emptied of a considerable quantity of semi-digested fermenting material often with an offensive odour and after the washings come back clear there may be a sudden gush of more decomposing contents This is pathognomonic

In pyloric obstruction as dilatation increases the stomach may be able to accommodate a gallon or more of material and, consequently the typical story of vomiting of huge quantities of this decomposing and fermenting material every evening or every other evening In other words it takes several meals to fill the cavity and it is only when this occurs that vomiting takes place usually therefore at the end of the day In such cases the vomitus when it stands separates out into three layers At the bottom there is a large amount of undigested food then a layer of mucus and digestive juices and then a top layer of froth If one watches it through a transparent container one sees bubbles forming on the undigested food particles and these float up to the top, discharge their gas bubbles and sink again If the obstruction is at all tight bile is unlikely to be present in the stomach contents

Wherever active ulceration is present blood may occur in the vomitus, as a result of bleeding from the ulcer surface

Does the Vomiting afford relief or not to Pain? This has been dealt with under pain and the immediate complete relief in simple uncomplicated ulcers has been emphasized The failure of relief of pain in functional disturbances chronic invalidism and carcinoma has also been referred to

Where obstruction and dilatation are present pain may not be a prominent feature and the patient s complaint may rather be one of discomfort In such cases vomiting will relieve this

Is the Vomiting controlled by Rest and Diet? Where vomiting voluntary or involuntary is the result of pain it is controlled by rest and diet Even where some degree of obstruction has resulted a fluid diet may relieve any symptoms of it for a time but if the obstruction be marked the relief is unlikely to be obtained

history of the complaint The ulcer patient, however, looks ill while the functional one usually looks in quite good condition

VOMITING

Vomiting as has been mentioned previously, is by no means as constant a symptom as pain in patients suffering from the same condition Accordingly it is not regarded as a cardinal symptom to the same degree as pain and consequently we have always to bear in mind the possibility of the patient being one of those who vomit with difficulty or not at all

The first point of importance is whether it precedes or follows the pain In simple chronic ulcers it always postdates the occurrence of pain In functional disorders it often precedes the development of pain though it may follow it In carcinoma of the stomach it is very apt to precede the pain at all events, in primary carcinoma as opposed to malignant change taking place in a previously simple ulcer

Is it Voluntary or Involuntary? Does the patient make himself vomit or does he vomit in spite of himself? In gastric ulcers the pain makes the patient vomit and it is therefore involuntary In duodenal ulcers he has possibly found out that there is no pain when the stomach is empty and consequently he induces vomiting which produces the desired result As a rule therefore, in duodenal ulcers the vomiting is voluntary When the ulcer, however has extended to involve the pylorus with the production of pylorospasm the vomiting frequently becomes involuntary In functional cases the vomiting may be either voluntary or involuntary, and the patient as a rule vomits very easily and on the slightest provocation

In carcinoma the vomiting is usually involuntary and is often preceded by marked nausea which is not a feature of simple ulcers In carcinoma it is especially prone to result from peritoneal spread

Is it Usual or Unusual? In gastric ulcers vomiting is the usual event though it is not always so In duodenal ulcers it is definitely unusual unless the patient has found it relieves him and he brings it on or the pylorus has become involved In functional cases it is exceedingly common and frequently repeated In carcinoma it is also common

Amount and Nature of the Vomit These vary considerably and depend on the pathology present If there is no obstruction the quantity is likely to be small and the vomitus to consist of the food last taken In such cases bile is often present Selective vomiting may at times be noted, i e, the return of only certain of the materials ingested, more especially the fluid portion It is much more likely to be present in cases of functional disturbance

If obstruction is produced by fibrosis in the attempted healing of the ulcer an hour glass constriction of the stomach may result or pyloric stenosis the latter due to gastric or duodenal ulceration respectively

(*b*) he feels faint
(*c*) he has a desire to go to stool
(*d*) he goes to stool and has a black, soft diarrhoeic motion
(*e*) he is afterwards noticed to be anaemic

In such cases the duodenal ulcer is situated on the pancreatic or concave side of the duodenum where the big vessels are, and not on the peritoneal or convex side and consequently generally speaking a duodenal ulcer which bleeds profusely is not likely to perforate and *vice versa* At the same time any ulcer may extend well round the lumen of the duodenum, and occasionally may tend to do both Both gastric and duodenal ulcers which bleed profusely tend by extension to a so-called chronic perforation by which is meant the continuous destruction of the gastric or duodenal wall and extension of the ulcer base into the pancreatic substance, rather than the peritoneum Where blood cannot be recognized macroscopically, microscopical and chemical tests are applied to the vomitus or faeces to demonstrate its presence or absence

Extensive gastric haemorrhages may occur without there being any history of ulcer and of these Rutherford Morison used to say

(*a*) Painless profuse purposeless haematemesis in a young woman means gastrostaxis It almost never recurs and the patient almost never dies

(*b*) Painless profuse perplexing haematemesis in an older patient means cirrhosis of the liver It is likely to be repeated and likely ultimately to be fatal

PREVIOUS HISTORY

Previous attacks of the same train of symptoms are the rule in simple chronic ulcers but are naturally not so in primary carcinoma On the other hand where carcinoma has developed in an old chronic ulcer there is pretty certain to be the old history of the ulcer with recurring attacks

The total Duration of Symptoms Thirty or forty years ago the average duration of symptoms in simple ulcers before the patient came to operation was about 8½ years, though this has been markedly shortened in recent times chiefly because of radiography and the freer use of the knife Individual cases may go on for twenty five to thirty years or more

In carcinoma of the stomach it has remained more or less the same viz about 8½ months This included those cases in which carcinoma developed on a previous simple ulcer and which, therefore prolonged the average duration considerably In a breaking down burn scar the average duration before carcinoma develops is fifteen years or so but occasionally the time is much less and this is usually so in the case of chronic gastric ulcer Chronic duodenal ulcer with the greatest rarity develops carcinoma and the writer s experience is limited to two cases in both following the extension of the ulcer to the gastric side of the pylorus

In the stage of chronic invalidism in simple ulcers and in carcinoma appreciable relief is unlikely In functional cases, as a rule relief is not obtained and this result is ordinarily a strong point against ulcer, if the duration of the illness is short

An interesting comparison may at this point be made of the early history of simple chronic ulcer and primary carcinoma of the stomach

In simple ulcer the sequence of events is usually pain first, followed by vomiting and, as a result loss of weight and condition (asthenia)

In primary carcinoma the sequence is reversed and the patient s complaints are first, loss of weight and condition (asthenia) then nausea and vomiting and finally pain

The clinical pictures are useful to remember, as they are correct in a large proportion of cases Where carcinoma has developed on an old chronic ulcer, a previous history of the symptoms of the chronic ulcer are obtainable

Blood

Blood may be present in the stomach contents or vomitus or in the faeces in case of ulceration

Amount and Frequency As usual this depends on the pathology In simple ulcers during activity microscopical and chemical evidences of blood are more or less continuously present, just as in any other active ulcer At the same time recurrent large haemorrhages are likely to occur, when deep extension of the ulcer is taking place usually involving larger vessels These repeated haemorrhages may occur at long intervals A considerable portion of such blood is likely to be bright red, if vomited, as no time is given for digestion to take place

In carcinoma on the other hand the tendency is for the growth itself to ulcerate and bleed no big vessels being involved In these circumstances haemorrhage is likely to be more or less continuous but it is small in amount although recognizable macroscopically, is usually more or less digested and gives the appearance of coffee grounds Big haemorrhages are uncommon though they may occur They are usually due to secondary sepsis with extensive deep ulceration

Haematemesis alone is strongly in favour of a gastric ulcer Melaena alone is equally strongly in favour of duodenal ulcer Haematemesis and melaena may occur in either

If instead of melaena reddish blood appears in the stool the haemor rhage must have been a very big one and the patient is likely to present gross anaemia

The typical story of haemorrhage from a duodenal ulcer with melaena is as follows

(*a*) The patient has a feeling of abdominal distention from the large haemorrhage taking place into the gut

(*b*) he feels faint

(*c*) he has a desire to go to stool

(*d*) he goes to stool and has a black soft diarrhoeic motion

(*e*) he is afterwards noticed to be anaemic

In such cases the duodenal ulcer is situated on the pancreatic or concave side of the duodenum where the big vessels are and not on the peritoneal or convex side and consequently generally speaking a duodenal ulcer which bleeds profusely is not likely to perforate and *vice versa* At the same time any ulcer may extend well round the lumen of the duodenum and occasionally may tend to do both Both gastric and duodenal ulcers which bleed profusely tend by extension to a so-called chronic perforation by which is meant the continuous destruction of the gastric or duodenal wall and extension of the ulcer base into the pancreatic substance rather than the peritoneum Where blood cannot be recognized macroscopically microscopical and chemical tests are applied to the vomitus or faeces to demonstrate its presence or absence

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Frequency of Attacks and Intermissions As the years pass by the attacks tend to become more frequent, and automatically the intermissions become of shorter and shorter duration In carcinoma there are no intermissions but a continuous retrogression

Season of the Year In the colder climates the winter is the chief season when the patient registers an exacerbation or recurrent attack of symptoms but in the hotter climes where there may be no marked cold spell the overpowering heat may be responsible for recrudescences

Worry is frequently productive of an exacerbation of symptoms and activity of the ulcer The patient loses his appetite as a result of worry and so drops condition

Any Gradual Restriction of Diet After years of history and numerous recurrences it is quite a common thing to find that the patient has gradually and steadily increased his restrictions of diet, article after article of food being blamed and successively being placed on the forbidden list

Loss of Weight This is the rule in simple ulcers especially during the periods of activity It is always expected in carcinoma In functional disturbances on the other hand it is often strikingly absent, the patient keeping up condition in spite of a martyrdom from symptoms Loss of weight may occur for a variety of reasons

(*a*) The patient may be afraid to eat and so restrict the diet excessively
(*b*) Vomiting by which much nutriment is lost
(*c*) Sepsis a very potent cause of loss of condition
(*d*) Carcinoma
(*e*) Haemorrhage which can be very depleting

PHYSICAL EXAMINATION GENERAL

The clinical diagnosis is usually made mostly on the history On examination there may be very little to be found except in the case of carcinoma and as a result of the special investigations which are mostly of laboratory type and not therefore clinical

Special search should be made for a septic focus in the mouth (teeth) throat (tonsils) nose and accessory sinuses in the case of simple ulcers The presence and degree of anaemia should be investigated especially if there has recently been a big haemorrhage Evidence of loss of weight and cachexia should be noted

PHYSICAL EXAMINATION LOCAL

INSPECTION

Usually there is nothing to be seen in the epigastrium Gastric peristalsis may be noted and if present strongly suggests obstruction most commonly pyloric In such a case the dilated stomach may be readily

outlined Even in very thin patients, normal gastric peristalsis is not usually observed A lump may be seen and if so strongly favours a carcinoma as the inflammatory swellings associated with simple ulcers are usually too small to be seen

PALPATION

Tenderness may be elicited either to the left or right of the midline In gastric cases it is usually to the left in duodenal cases to the right It is well to keep in mind that the ulcer may not be in a position to be felt and so tenderness may not be found The presence of tenderness suggests activity of the ulcer, the more active and the greater the tendency to spread especially anteriorly the greater the tenderness

Rigidity This is likely to be in the same position as the tenderness in the gastric cases involving the upper left rectus muscle, in duodenal cases the upper right rectus

Voluntary rigidity is uncommon in these patients on account of the chronic nature of the condition

Involuntary rigidity, on the other hand is associated with activity and extension especially to the overlying peritoneum and this may be either inflammatory or malignant In simple ulcers it may indicate a tendency to perforate and where it is marked one has seen perforation occur quite soon afterwards in one case before the patient could get through the routine of admission to hospital In malignant cases it means infiltration and peritoneal involvement, and is an extremely bad prognostic feature A point of interest is that the patients naturally usually only seek advice during the periods of activity of the ulcers Inflammatory lesions (chronic ulcers) tend to show tenderness and rigidity early whereas in carcinoma it is a late development in the course of the disease, suggesting peritoneal spread and inoperability

Lump If a lump be felt then as usual it should be investigated as to consistency surface edge and relations This may be very difficult or even impossible on account of the position of it, perhaps passing under the costal margin its depth and possible rigidity over it Stoutly built individuals increase the difficulty If a lump can be felt it is usually a carcinoma but simple ulcers may give rise to inflammatory thickening or even a localised abscess from a tiny perforation This however is uncommon Sometimes there is nothing more than an impression that a lump is present

If fixity or mobility can be determined whether due to respiration or manipulation it is helpful Inflammatory masses are usually fixed while a carcinoma is mobile for a long time, and fixity means wide infiltration

Succussion The demonstration of succussion may or may not be of value Without any organic disease at all it may be obtained after

drinking a good deal of liquid or in a flabby, atonic, ptotic stomach It is also present in obstruction with dilatation, even if the patient has not recently drunk fluid either from residual food or a concomitant chronic gastritis with excessive mucous secretion or both In such cases it is persistent and continuous i e as long as it is tried for it can be obtained This is especially important as otherwise it usually ceases after two or three splashes In a very atonic stomach however, it may persist without any organic obstruction being present In such a case there is no accompanying or earlier history of a chronic ulcer, the patient being usually of the highly strung nervous type

PERCUSSION

The chief value of this is to determine the relation of any mass to gut and to liver, also whether the mass itself is resonant or dull

AUSCULTATION

This is of some value as demonstrating peristalsis, if it is not obvious Gurgling and splashing may be heard

Auscultatory percussion, with the object of determining the size of the stomach, is a very unreliable method, as an adjacent distended colon *will overlap the stomach resonance*

SPECIAL EXAMINATION

The size of the stomach can be demonstrated readily by giving the patient two portions of a Seidlitz powder separately The gas given off distends the stomach and it gradually presents in the epigastrium when the shape and peristalsis may be noted

Stomach Lavage If the patient is not vomiting quite an amount of information may be obtained by a stomach tube about the amount and nature of the contents If the stomach is empty of food the amount of the resting juice will be noted and its composition The fractional test meal is that most in vogue at the present time and by it the pro gressive secretory function of the stomach can be gauged and also its motility The old one hour test meal was employed simply to determine the secretion and its character and the old heavy test meal with lavage at the end of six hours was to demonstrate the motility These were both of value and still are if radiological investigation cannot be obtained and the more detailed fractional meal cannot be carried out The duodenal tube will give information, not only about the stomach but also about the duodenal contents secretions etc

Radiography with the aid of barium replaces the old heavy test meal It is important to remember that it is not strictly comparable to an ordinary meal and the interpretation of the findings is strictly in terms

of barium meals Barium sulphate is inert and has little influence on the secretory function of the stomach The points to be noted are numerous and they are all important

Its position whether high or low, its size whether large or small, and its shape, which varies greatly with the type of individual and whether it is tonic or atonic Clinically we usually accept that the stomach is small if we can get no succussion

In duodenal ulcer cases the stomach is usually hyperperistaltic and it is small until obstruction and dilatation develop It is usually high and transverse In gastric ulcers there is often a biggish atonic stomach with little peristalsis It is usually sagging and low

The resting contents can usually be seen floating on the top of the barium and their amount estimated

Contour The outline of the rugae can be seen and their size continuity and direction noted They are usually enlarged in chronic gastritis in carcinoma they are interrupted by the infiltration and in chronic ulcers they often radiate towards the niche of the ulcer

The niche of the ulcer can usually be demonstrated filled with barium Its size depth and general characters can be observed, suggestive of simplicity or malignancy

A notch is frequently seen in the wall of the stomach opposite the ulcer This may be a functional spasm or a fibrous contraction In the former it may be temporary and can be obliterated by anti spasmodics, in the latter it is permanent and ineradicable

A filling defect may be observed i e a portion of the barium may be displaced This is typically seen in carcinoma where the growth is responsible but in a minor way it may be seen in simple ulcers if there is a swelling from oedema Spastic contraction of the muscel opposite an ulcer may produce a filling defect described above as a notch but this can be obliterated by anti spasmodics and is thus shown to be functional Those that are organic cannot be made to disappear in this way and so differentiation can be made

Motility is also observed as indicated by the character of the peris talsis whether good bad or indifferent

Obstruction also can usually be determined Delay in emptying is the usual indication of this but this means that dilatation is com mencing or may be well established In the early stages of obstruction however compensation is obtained by muscle hypertrophy and the emptying is not delayed At this stage the only indication may be increased and deeper peristalsis often with a small stomach It is particularly important to get this information as in simple ulcer, it indicates that healing without operation is not so likely as where no obstruction exists and further the ulcer is more likely to break down again if it does heal each time producing more fibrous tissue and each

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Fig 34 Simple chronic gastric ulcer of the lesser curve (niche) above mid gastric sphincter with marked spastic muscular contraction opposite it (notch)



Fig 35 Simple chronic duodenal ulcer with marked deformity and some obstruction as shown by the retained fluid above the barium



Fig 36 Simple tumour of fundus (leiomyoma) with deep ulceration Death from haemorrhage No symptoms



Fig 37 Simple submucous cysts of antrum with filling defect in barium shadow

time increasing the obstruction In such cases it is wise to advocate operative interference at once

Gastroscopy may be carried out usually after all other investigations have been made In many cases an ulcer or growth can be seen and an absolute diagnosis made (Figs 34 49)



Fig 42 Diffuse carcinoma of stomach leather bottle with general narrowing of lumen

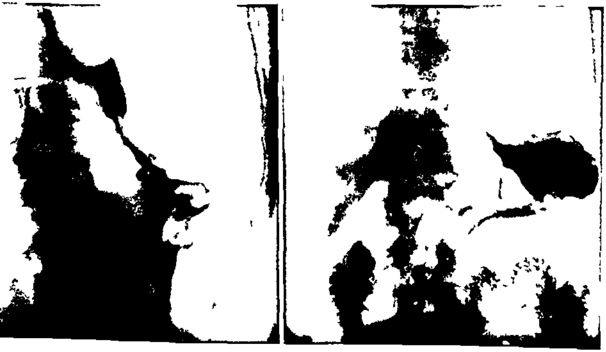


Fig 43 *a* and *b* Carcinoma of fundus of stomach invading the oesophagus Note deformity of fundal air bubble



Fig 38 Carcinoma of pylorus and adjacent antrum without obstruction Photograph taken three minutes after a barium meal



Fig 39 Annular scirrhous carcinoma of pylorus with marked obstruction Note large collection of retained fluid above barium



Fig 40 Carcinoma of lesser curve above the mid-gastric sphincter with typical crater ulcer formation.



Fig 41 Polypoid carcinoma of antrum and body of stomach with gross irregular filling defects



Fig 42 Diffuse carcinoma of stomach leather bottle with general narrowing of lumen

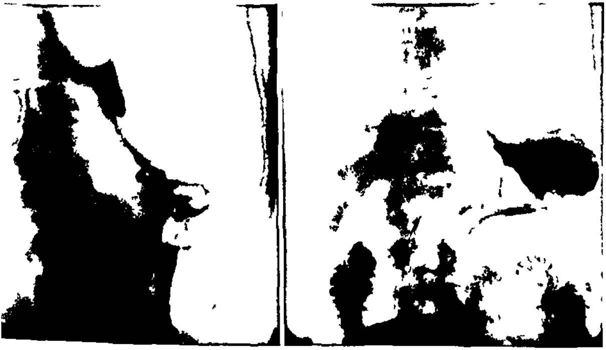


Fig 43 *a* and *b* Carcinoma of fundus of stomach invading the oesophagus Note deformity of fundal air bubble



44a



44b

Fig 44 *a d* Specimens showing types of gastric carcinoma *a* Annular stricture of pylorus *b* Crateriform ulcer of antrum *c* Polypoid carcinoma of antrum *d* Diffuse carcinoma (leather bottle)



44c



44d



Fig 45 Secondary carcinomatous gland in left supraclavicular fossa (Virchow Troisier) in a case of carcinoma of the stomach



Fig 47 Calcified hydatid of liver An epigastric lump possibly gastric shown to be extra gastric

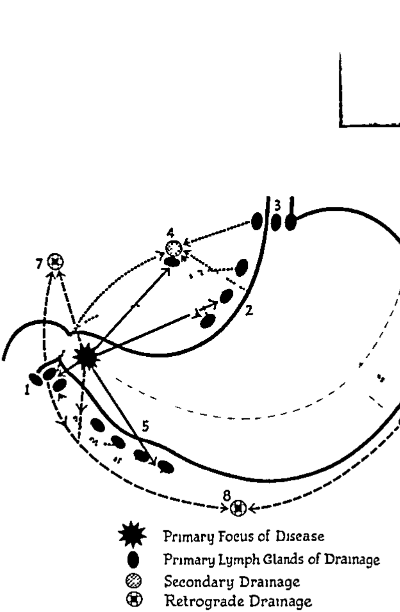


Fig 46 Diagrammatic picture of lymph drainage of stomach 1 Subpyloric group of glands 2 Upper lesser curve group of glands 3 Cardiac group of glands 4 Coeliac group of glands 5 Greater curve (right) group of glands 6 Greater curve (left) group of glands 7 Hepatic group of glands (portal fissure especially) 8 Superior mesenteric group of glands



Fig 48 Large epigastric swelling ? gastric shown to be extra gastric Found to be pseudo pancreatic cyst

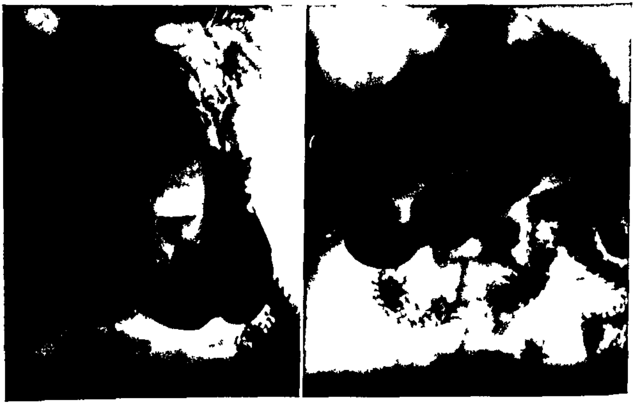


Fig 49 *a* and *b* Two views (*a* Upright *b* Recumbent) of diverticulum of terminal duodenum Patient had dyspeptic symptoms

SCHEME VIII

APPENDICITIS SPECIAL FEATURES

Acute appendicitis is mainly considered but chronic appendicitis will also be referred to

HISTORY PRESENT ATTACK

Acute Form The Murphy sequence of pain vomiting and temperature remains the characteristic feature of acute appendicitis

PAIN

Onset This commonly occurs at night a usual feature of inflammation developing in a hollow muscular system It is in contrast to the onset of perforation of ulcer and strangulation of hernia which usually appear during some activity of the patient The patient is frequently awakened by it

Circumstances Associated Because of the night disturbance some article of food taken the day before is always sought for as a cause and frequently found to the satisfaction of the patient or the parents in the case of a child This often has very serious consequences as home remedies are given a thorough trial before the doctor is called in when the situation may be very grave In gastro enteritis the cause is generally infected food and the contrast of the two conditions will be considered later

Suddenness As in the case of other hollow muscular systems suddenness of onset suggests a mechanical obstructive agent e g a stercolith or a stricture the obstruction occurring first although in the case of stricture inflammation may very quickly lead to sufficient swelling to produce a block In a primary attack, such as is seen in children especially no sudden onset is met the condition starting with a general malaise and indeterminate abdominal pains a stomach ache A sudden onset usually means previous attacks which have resulted in stricture and stercolith formation

Severity On the whole pain referred from the appendix whether due to sudden mechanical obstruction or inflammation is less severe than that from other hollow muscular systems and the explanation may be that we are dealing with a vestigial structure which is under going retrogression in structure as well as function This is so definite

that extremely severe colic is unlikely to be due to the appendix and some other cause should be sought e g, enteritis This is a majority finding and therefore not one hundred per cent correct

Situation Pain referred from the appendix is felt in the region of the umbilicus and at first the patient if a poor observer, usually indicates it with the flat of his hand over the centre of the abdomen including the umbilicus It is therefore, the same as for any portion of the intestine in the superior mesenteric distribution, which is covered by the tenth dorsal segment Whether it is due to intra mural or intra luminal tension it is in the same situation but, as is usually found the pain due to intra mural tension is less severe than that due to intra luminal tension

Character The character of the pain depends on the pathology responsible In a primary attack which commences in a previously normal appendix the tension which produces the pain is due to intra mural exudation to start with The pain, therefore, is a continuous ache felt at the umbilicus and not severe at all In children this commonly results in a dose of castor oil and often unjustifiable delay Later it may be twenty four hours or more, obstruction of the lumen of the appendix results from submucous oedema, the obstruction usually occurring at the appendiculo caecal junction where the rigidity of the peritoneal and subperitoneal tissues seems to play a part This does not hold in the so-called foetal appendix, which is infundibuliform in shape like that of an ape

With the onset of obstruction the pain becomes that typical of acute obstruction of any hollow muscular viscus, i e it is continuous with exacerbations due to peristalsis It is still referred This will continue till either the obstruction is relieved or the appendix becomes gangrenous when it may cease or till involvement of the overlying parietal peritoneum occurs, by continuity spread or actual rupture when it is completely changed in character

In children, in particular, acute appendicitis is likely to be serious as in the early stages it is the parents and not the patient who decide how important the condition is and as stomach ache is a frequent complaint of children who systematically over eat even if they don t eat the wrong things delay is so ordinary a feature that it has become almost a platitude to say that in children the appendix is always found to be worse than was expected It is not strictly true, but it arises from the habit of timing the commencement of the attack from the start of obstructive symptoms instead of the seediness and stomach ache which precede these, and which accompany the fever arising from the infection In attacks primarily obstructive the fever follows the obstruction with its symptoms, instead of preceding it as above

In the primarily obstructive attacks commonly due, as mentioned to stricture and stercolith the obstruction may be incomplete at first

and if so the pain is intermittent only i e it is due entirely to the peristalsis and between the waves there is no tension to produce pain When inflammation supervenes swelling of the mucosa makes the obstruction complete and then continuous pain with exacerbations develops just as in the primary inflammatory attack followed by obstruction

Change of Situation Change of situation of the pain from the umbilicus takes place when the parietal peritoneum over the appendix becomes irritated by spread of the infection and inflammation either by continuity through the wall and then contiguity or by rupture of the appendix and extravasation of its contents In either case the pain is now felt at the site of irritation and the area involved in the pain corresponds in extent to the area of parietal peritoneum affected This is likely to be much greater where rupture takes place than where the infection spreads by continuity and then contiguity The change is also much more likely to be sudden in the case of rupture and gradual in the other

The situation in which the first peritonitic pain occurs is likely to indicate the site where the appendix is lying and so is of the greatest possible importance to determine On the other hand, if the parietal peritoneum is shut off from the appendix site e g by gut or omentum this pain cannot develop and again therefore the recognition of such a state of affairs is of paramount importance as both the patient and the doctor may be deceived and the patient may walk into the consulting room with an abscess already developed

Change of Character The change of situation caused as it is by a change in the pathology is also accompanied by a change of character for the same reason The pain now is due to parietal peritoneal irritation and as such presents the typical serous membrane variety viz the severe lancinating or stab like character While it is of the same nature whether due to gradual extension or rupture of the appendix it is slower in development in the former and less likely to cause shock and collapse which commonly accompany the latter

Vomiting

In general terms vomiting is not a prominent symptom of acute appendicitis, though it commonly occurs During the early stages where intra mural tension alone is present vomiting is unlikely to occur at all though nausea may be present It is not until obstruction occurs with the increased severity of the pain and its cramp like nature that the patient may vomit though as usual some patients never vomit at all Vomiting however when it does occur is rarely if ever marked it is not frequent it is not persistent and it is not profuse As a rule it consists in one to three attacks of mild vomiting usually only of stomach

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must be distinguished from the late cases in which a diffuse peritonitis may be present or a pelvic abscess has developed in which latter case we get a spurious diarrhoea as the abscess progresses towards its evacuation into the rectum This is unlikely to occur in less than 12 14 days In children diarrhoea in an attack of acute appendicitis may occur instead of vomiting It is an unusual event, but it carries with it no suggestion of any alteration in the type and progress of the case, although it may increase the difficulty of diagnosis In adults on the other hand the position is different The occurrence of diarrhoea usually means an uncommonly severe attack and the outlook is extremely grave if the diagnosis is missed and early operation not carried out

Mrnsis

The ordinary attack of acute appendicitis is unrelated to the menses The attack may be coincident with the epoch, and still have no relation to it If there is a definite relation of the menstrual flow to the abdominal attack the condition is probably not one of appendicitis It is likely to be on the other hand some inflammatory condition of the uterus or adnexa or such a condition as a ruptured ectopic pregnancy twisted ovarian cyst etc

In exceptional cases where pelvic inflammation may have been present and the appendix is bound up with the tube menstrual dis turbances may occur as the result of appendicitis It is, however a rare association and unfortunately one of those possibilities which lends itself to gross charlatanism

Acute Gastro enteritis

In acute gastro enteritis which is the commonest condition to be mistaken for acute appendicitis, and *vice versa* the clinical history is usually quite different The attack is usually traceable to some con taminated food and other individuals are likely to be affected The pain resembles the early pain of acute appendicitis but it is usually more severe and it is likely to involve the colon as well with hypo gastric distribution as well as an umbilical one Vomiting is likely to become more severe and continuous than in acute appendicitis and it is commonly accompanied by diarrhoea which may also be very marked Fever is often present but it may be negligible Micturition involvement is absent

In the so called abdominal or gastric influenza' i e an influenza where the local symptoms are mainly abdominal acute appendicitis is a common mistake in diagnosis As a rule the case is only one of many, the fever is more marked often 103° F or more, with all its accom paniments including headache and general body pains whereas the abdominal pain is often more severe and cramp like than in appendicitis

contents This is so regularly the case that the occurrence of excessive vomiting is strongly against the diagnosis of appendicitis

Later, if the attack progresses to the development of peritonitis vomiting is likely to recur, i e 24 48 hours after the initial attack In those cases where there is gradual extension to a limited involvement of the parietal peritoneum there may be a mild attack of vomiting as in the earlier period or none at all On the other hand where the peritoneal spread is due to rupture and sudden extravasation the vomiting may be much more marked and persistent, especially as a diffuse peritonitis develops

Temperature

In the average case of acute appendicitis there is fever present, and indications of this will be given The fever, however, is not as a rule marked, even in children, and should it be so it is a point against appendicitis—this will be referred to in detail under "Examination"

Micturition

Micturition symptoms are not a usual accompaniment of acute appendicitis, but two conditions may produce them

(*a*) *A Pelvic Appendix* In such cases micturition symptoms follow *extension of the inflammation outside the appendix to the peritoneum*, and the bladder wall is involved The symptoms complained of are

(1) Difficulty in starting the act This hesitancy is due to the inflammation of the peritoneum over the bladder wall which interferes with its peristalsis
(2) Pain during the act of micturition produced by the bladder contractions
(3) Complete retention may ultimately develop, from the peritonitis producing a paralytic condition of the bladder wall just as happens in the case of the gut

(*b*) In certain cases where the appendix lies *medially* to the caecum and in close association with the ureter inflammation of the appendix as it extends may involve the wall of the ureter In such cases irritation of the ureter may lead to a desire to micturate, with increased frequency and possibly ureteric pain resembling a calculous attack The resemblance may be increased by the passage of blood in the urine and as a result the case may be missed altogether Such an event is likely to be tragic

Bowels

The average case of acute appedicitis is associated with constipation, as is customary in all inflammatory conditions There are however, exceptional cases where the patient may complain of diarrhoea This

tionally of the stomach and the caecum At the same time as food intake closes the pylorus it opens the ileocaecal valve, but the chief relations are seen in the lower animals where the stomach and caecum of which the appendix is just the terminal part are frequently complementary In many animals of similar family those with simple stomachs have much more developed caeca while those with complicated stomachs have much simpler caeca In these it is well shown how the ileocaecal valve corresponds to the cardiac sphincter, while the pylorus is represented by a caecocolic valve situated at the commencement of what corresponds to the ascending colon The dyspeptic symptoms depend upon the occurrence of pylorospasm for their origin and it is significant that only in the early and mild cases may permanent relief be obtained by removal of the appendix In the more marked cases the hypertrophy of the pylorus the result of the recurrent spasm does not return to normal and a pyloroplasty may be necessary in addition to appendicectomy before complete relief is obtained (Figs 50 59)

HISTORY PREVIOUS ATTACKS

A history of previous attacks is strong corroborative evidence in favour of appendicitis and these attacks may resemble either the primarily inflammatory ones or those primarily mechanical Such cases are much more likely to terminate in an acute attack than those cases of appendix dyspepsia described above Even in these however with progressive fibrosis starting at the tip one has to bear in mind that persistent infection is present and consequently a severe light up may result in an acute attack

In a single week in the writer s hospital wards three cases have been admitted as emergency acute attacks from the waiting list of those diagnosed as suffering from chronic appendicitis

In chronic appendicitis the very nature of it carries the implication that we are dealing with a mild infection, and in the presence of obstruction such an infection is more prone to a virulent recrudescence than in those cases where obstruction is absent

PHYSICAL EXAMINATION GENERAL

Facies This may be of the greatest possible importance especially in those cases of doubt as to how a probable acute appendicitis case is progressing and whether in consequence expectant or operative treatment is indicated The patient may or may not look ill and not infrequently the appearance of illness may be the best gauge that the attack is a severe and progressive one As is usual with abdominal cases the lower part of the face registers most of the disturbance whereas in such cases as so called gastric influenza where abdominal pain may be marked

Diarrhoea is usually absent and constipation the rule which increase the difficulty in diagnosis

CHRONIC APPENDICITIS

In chronic appendicitis also certain features call for attention There are two common types (*a*) those in which there is a stricture of the appendix the result of a previous attack and likely to be associated with recurrent acute or sub acute attacks (*b*) those without a stricture with progressive destructive pathology, and which are likely to be associated with appendix dyspepsia without any characteristic appen dix attacks

(*a*) The first type with an organic partial obstruction and probable permanent infection is likely to give rise to recurrent attacks which resemble those already described although they vary markedly in their severity They may be more or less entirely mechanical especially if a stercolith is present with sudden onset fairly severe griping pain with fever absent or minimal and following the obstructive attack On the other hand the infection may relight and be primarily responsible for the attack the obstructive element coming later though the block is much more readily produced than in a previously healthy appendix Anything up to gangrene and perforation may result and the case may run a course parallel to that described for acute appendicitis Where mild recurrent attacks take place a modification in the symptoms tends to occur in this respect that the patient begins to localise his pain in the right iliac fossa instead of at the umbilicus while there is still no evidence of peritoneal irritation This has given rise to much controversy but the most reasonable explanation is that the patient knows that he is tender over the appendix with these attacks and that the seat of tenderness is the origin of the pain and he begins subconsciously to place his pain there

(*b*) Mild progressive pathology in the appendix mostly fibrosis without stricture and associated with dyspeptic symptoms This is particularly of importance as the case may be mistaken for peptic ulcer It has usually however features which contra indicate the likelihood of ulcer Pain after food is the commonest symptom but instead of being a constant relationship it usually varies from half to one and a half hours after ingestion in the same individual without reference to the type of food The same relief is not obtained by diet alkalies or vomiting as is seen in ulcer and there is no seasonal relationship There is often a marked feeling of fullness and distention with the pain nausea is not marked and relief is more likely to be obtained by gas eructation than vomiting Tenderness is likely to be felt over the appen dix and this is constant but there is no fever with the condition as a rule

The explanation undoubtedly depends on the close relation func-

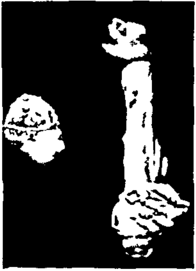


Fig 54 Primary acute appendicitis Complete gangrene Sloughed appendix and stercorolith found free in abscess cavity

Fig 55 Secondary acute appendicitis following stricture and stercorolith gangrene distal to stricture Affected part wrapped up in omentum with early mobi'e lump

Fig 56 Secondary acute appendicitis entirely distal to stric ure Mild case with muco-pus



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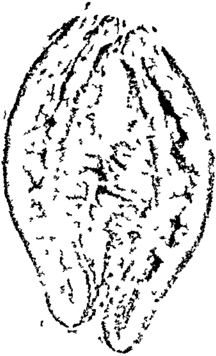
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Fig 57 Secondary mild appendicitis following stricture at base Two types of sacculi present (a) Along mesenteric border (b) Antimesenteric near tip



Fig 58 Secondary acute appendicitis following complete obliteration by fibrosis distally Proximal acute attack with perforation and abscess formation



Specimens

Fig 50 Early primary acute appendicitis No thrombosis yet no peritonitis



Fig 51 Primary acute appendicitis Thrombosis extending into mesentery base sloughed through diffuse peritonitis

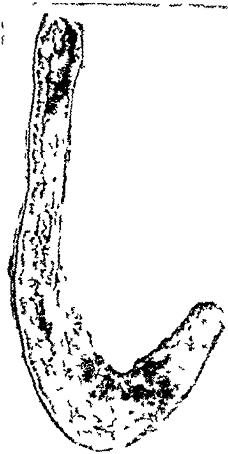


Fig 52. Primary acute appendicitis Partial destruction distally no perforation localised peritonitis by continuity extension



Fig 53 Primary acute appendicitis Complete gangrene and thrombosis of mesentery Tiny perforation near tip preceded by period of complete absence of pain

without diarrhoea the upper part of the face is chiefly affected, as the patient is likely to have a severe headache at the same time and the conjunctivae are generally suffused This appearance of the conjunctivae is not the rule in appendicitis

Tongue In most acute cases the tongue presents a brown fur, with malodorous breath as a contrast to the other causes of fever, e g influenza pneumonia or gonococcal infection where in the early stages the fur is white and unassociated with a bad odour In the worst cases the lips and teeth may be covered with sordes

Temperature and Pulse The mildness of both is striking in most cases The temperature usually does not rise above 101 5° F even in children In a case of acute appendicitis if the temperature rises to 102 5° F or more then it is pretty certain that some complication is present such as spread into the mesentery, or even a pylephlebitis Fortunately these complications are uncommon and as a result a temperature of 103° F strongly suggests that the case is not one of appendicitis Gonococcal salpingitis with peritonitis is likely to have a high temperature like this but the patient often does not look very ill with it and on the other hand in children a pneumococcal peritonitis will often present a temperature up to 104° F or more and *the patient usually looks ill* *Particularly* in pneumococcal peritonitis is herpes febrilis likely to appear on the lips

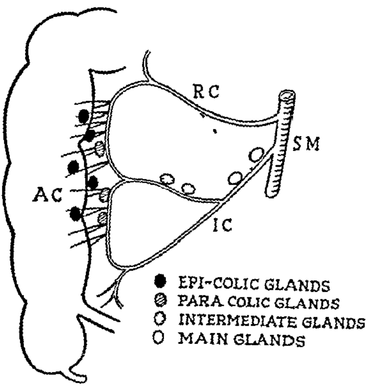
The pulse is usually raised with the temperature but frequently they do not go hand in hand and watching the progress of a case entails observations on them separately One may appear to improve while the other indicates worsening of the condition If either is getting worse it is wise to accept this as an indication that the pathology is progressing unfavourably

Blood The presence of a leucocytosis is looked for As a rule it is present and it is an important help in doubtful cases It is usually not high the average count between 12 000 18 000 *per c mm* the latter being regarded as high If the count be in the region of 25 000 30,000 per c mm it strongly favours gonococcal peritonitis while if it is over 40 000 per c mm it points to pneumococcal peritonitis A falling leucocyte count with the patient s condition increasing in gravity is as serious a prognostic feature here as in other inflammatory conditions

PHYSICAL EXAMINATION LOCAL

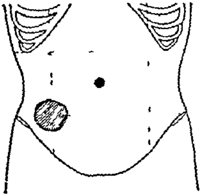
INSPECTION

Respiratory movement is restricted only where there is muscular rigidity While rigidity may be voluntary or involuntary voluntary rigidity is normally stimulated by examination i e palpation and the fear of being hurt and so it is not commonly seen when no palpa tion is being carried out

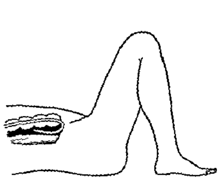


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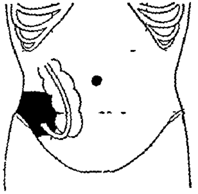
Fig 59 Line drawing of type lymphatic drainage of colon including appendix and main drainage of rectum



60a

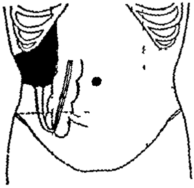


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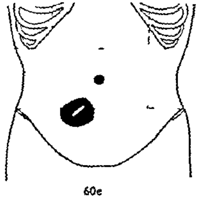
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Fig 60 Series of line drawings to indicate the position of the appendix and the mass in appendix abscesses (Rutherford Morison) —
a Appendix and mass sub caecal
b Appendix and mass retro caecal or retro colic
c Appendix and mass extra caecal or extra colic



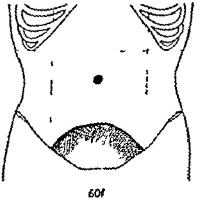
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d Appendix and mass sub-hepatic.



60e

e Appendix and mass medial to caecum



60f

f Appendix and mass in pelvis

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PHYSICAL EXAMINATION LOCAL

Inspection

Respiratory movement is restricted only where there is muscular rigidity While rigidity may be voluntary or involuntary voluntary rigidity is normally stimulated by examination i e palpation and the fear of being hurt and so it is not commonly seen when no palpa tion is being carried out

Restriction of respiratory movement on inspection therefore usually means that it is involuntary, and so the result of parietal peritoneal irritation i e peritonitis The situation and extent of the restriction strictly corresponds to those of the rigidity, which in its turn corresponds to those of the peritonitis Much exact and important information may thus be obtained

Marks of Hot Applications Heat if it be used may be relied upon to be applied at the site at which he feels pain whether it be referred or localised to the seat of inflammation as in peritonitis It therefore *gives a very definite indication of the situation of the pain and also* of its severity as the patient is unlikely to burn himself unless the pain is bad

Distention rarely develops without peritonitis and its appearance therefore suggests its occurrence especially if generalised

Localised swelling or a lump may be seen but this is extremely unlikely in the early stages When it is present it almost certainly means an abscess It may be felt much earlier than it can be seen

Palpation

Tenderness As has been emphasised the tenderness is not at the site of referred pain which is usually *relieved* by pressure

In the early stage it is the appendix itself which causes the tenderness whereas later it is often the peritonitis In the former case it is usually very localised and indicates the position of the appendix and is of value therefore as a pointer to the site of the incision which should be made to deal with it In these early cases the degree of tenderness depends mainly on the tension in the appendix and is therefore the more severe the more acute the condition but it also depends upon one s ability to increase it by pressure on the appendix In other words in some situations it is easier to compress the appendix than in others Where it can be pressed against a resistant structure e g bone as in the iliac fossa it is easier to produce a big rise in tension and so great aggravation in the pain whereas medial to the caecum where it may overhang the pelvis and be surrounded by gut it may be almost impossible to compress it as it just bobs away under the fingers In such cases little or no tenderness may be obtained and it is just in these cases that the diagnosis is likely to be missed

The appendix varies in its situation with the caecum and therefore may be found with it anywhere from the sub hepatic region to the bottom of the pelvis but it also varies in relation to the caecum itself lying possibly in front behind or on either side of it The situation of the tender spot therefore is of the greatest importance in deciding its position In a pelvic appendix the tenderness may only be elicited on rectal or vaginal examination

In the case of peritonitis it corresponds in extent to the peritonitis in so far as it involves the parietal peritoneum, and its continued observation will indicate any extension of the inflammation

Skin hyperaesthesia is not of the value of the other physical signs and is only likely to be of any use in the early stages where referred pain is present It is in many cases unreliable, as local tenderness is apt to be confused with it by the patient

Rigidity As has been repeatedly emphasized this may be voluntary or involuntary, and it is most important to differentiate them By distracting the patient s attention and careful handling voluntary rigidity may be completely got rid of, but this is not so with involun tary rigidity Involuntary rigidity is the important one as it commonly results from parietal peritoneal irritation and suggests strongly the development of peritonitis In such cases the situation and extent of the rigidity usually corresponds to the extent of the peritonitis just as was seen in the case of the tenderness in peritonitis

We find therefore, that in peritonitis as a rule the pain tenderness and rigidity all correspond, i e, in relation to the involvement of the parietal peritoneum In referred pain however, the tenderness never corresponds to it and while during peristaltic cramp like exacerbations voluntary rigidity may correspond to the pain with palpation on the other hand any rigidity the patient may produce is at the site of tenderness As the tenderness and rigidity correspond so definitely to the extent of parietal peritoneum involved in a case of peritonitis where doubt as to progress is present careful watching of the behaviour of these two physical signs may give all the information looked for

A most important point arises in those cases where the appendix is tucked away by bowel or omentum from possible contact with the parietal peritoneum Extension of the infection to the peritoneum in these cases may not involve the parietal peritoneum at all and there fore, rigidity may be absent The patient suffers little local disability and it is in this type of case that we find the patient walking into hospital with an abscess already developed and often of several days duration In the so called subcaecal appendix a term meant to indicate an appendix under cover of the caecum but still in the peritoneal cavity the caecum will often shut off the appendix focus and an abscess often develops days before medical advice is sought While in many of these cases the abscess if left alone may burst into the caecum and so cure itself there is always the possibility that it may extend under the cover of the caecum and present at its lower or outer border subsequently bursting into the general peritoneal cavity, frequently with fatal con sequences It is just in these cases that observation of tenderness and rigidity may save the patient s life As the abscess extends towards the general peritoneal cavity it is preceded by an extension of inflammation

and this is heralded by the appearance of an extending tenderness and rigidity Such an observation will determine an emergency operation instead of sitting on the fence waiting for the abscess to rupture into the bowel

Mass In cases of acute appendicitis the development of a mass after the third day means an abscess A mass developing earlier than this usually means the inflamed appendix wrapped up in omentum

It is important to remember that where diffuse peritonitis is likely to occur, it commonly develops without a mass ever being felt though the thickened appendix itself may sometimes be felt before its rupture, if it is not too tender Whenever a mass is felt its consistency, surface, edge and relations must be ascertained as far as possible If the anterior parietal peritoneum is involved all of these manifestations may be masked by rigidity

Fluctuation is never felt unless the abscess is large and superficial The surface tends to be smooth and the edge is usually ill defined, partly from the inflammatory infiltration and partly from the rigidity

The relations of the mass are the most important feature as they will usually indicate the situation of the appendix (Fig 60) The chief points are its position, its mobility or fixity and its relation to the gut

The position of the mass varies with that of the appendix In the subcaecal type the mass is at McBurney s point or slightly below it In the retro-caecal it is at McBurney s point and just above it The difference is that the subcaecal mass is ultra peritoneal while the retro caecal is extra peritoneal

The retro colic is above the level of the iliac crest and behind the colon It is extra peritoneal

The extra-caecal lies at the lower and lateral border of the caecum just above the lateral part of Poupart s ligament and the anterior superior iliac spine

The extra-colic lies lateral to the colon and may hug the iliac crest or be situated above this in the loin

The mass may lie medial to the caecum and may back on to the posterior abdominal wall or overhang the pelvic inlet

If the mass is in the pelvis itself it may not be palpated at all from the abdomen and require rectal or vaginal examination. The tendency is for all of these masses to be fixed from inflammatory infiltration and adhesions except that which lies medial to the caecum overhanging the pelvic inlet riding on loops of gut and separated from the anterior belly wall It is inclined to bob down with pressure As a rule this abscess is not felt *per rectum* as it is too high but in the later stages as it increases in size it may be reached by the examining finger

The early fixity of the mass is a most important differential point in relation to carcinoma of the ileo-caecal region, especially when the

indications of acute appendicitis have been mild Carcinoma remains mobile for a long time indeed until infiltration or secondary sepsis fixes it

Relation to Gut Wherever gut overlies the appendix abscess it is resonant on percussion whether it be caecum, colon or small bowel Muscular rigidity if present may impair the note but careful observation will show that the note is not the dead dull one of fluid

A relation of special importance is found in respect of the retro caecal appendix abscess The appendix and its abscess lie directly on the fascia covering the ilio psoas which becomes involved by the inflammatory spread While therefore in common with the subcaecal appendix abscess there is absence of involvement of the anterior parietal peritoneum and a corresponding absence of the symptoms associated with that in this type the ilio psoas is involved in the inflammation As a result flexion of the hip occurs to relieve tension Should the psoas be affected the flexion is usually at least one of 45°, but if the iliacus alone is involved as in the more lateral abscesses flexion is usually 30° or less It is a point of interest rather than of importance This flexion which is absent in the subcaecal abscess is likely to result in the patient coming for medical advice more quickly, owing to the limping and disability caused

Not infrequently where it has been decided to treat an abscess expectantly rather than by operation in the hope that it will discharge of its own accord into the bowel, this event can be diagnosed as having taken place by the improvement in the temperature and the general condition and locally by the diminution in the size of the mass It becomes progressively less and better defined and ultimately disappears It is important to recognize that unless the abscess opens low down in the sigmoid or rectum and is of considerable size the pus may not be recognized by the patient When the abscess ruptures into the caecum it is rarely recognized by the nurse in attendance

Rectal Examination An inflamed pelvic appendix may be felt *per rectum* and as it is usually lying on the right lateral wall it is felt through the right wall of the rectum

A pelvic abscess is more likely to be felt if it reaches the bottom of Douglas s pouch More information is obtained by vaginal than rectal examination in the female and this is therefore carried out for preference

Rectally in the male a pelvic abscess reaching the bottom of Douglas s pouch is felt just above the prostrate As it develops it bulges increasingly backwards and the rectal mucous membrane becomes increasingly thickened and oedematous Increased frequency of defaecation and the passage of mucus follow and finally there is complete loss of anal control and mucus runs continuously into the bed The anus at this stage is patulous and the abscess is about to open It is better to

open it now than to wait for it to burst as a certain percentage of the abscesses rupture into the general peritoneal cavity, often with a fatal result If the abscess is situated high in the pelvis, with loops of gut between it and the floor, it may not be felt at all in the early stages, but later may bulge further down In these cases patulosity of the anus with loss of control does not occur and it is dangerous to attempt to open them by the rectum, as small gut may be punctured and an ileo rectal fistula result It is usual to allow them to open into the rectum high up themselves always watching carefully for any indication that they are tending to rupture into the general peritoneal cavity If this is suggested by hypogastric tenderness and rigidity, especially if these are spreading the abscess must be opened at once in the hypogastrium and drained

In the female rectal examination will discover the cervix, and a pelvic abscess is situated above it

Vaginal examination will show the abscess behind the uterus The pelvic appendix itself mav be felt early high up in the front fornix

Percussion

The chief value of percussion in cases of acute appendicitis is the demonstration of the relationship of the gut to any mass that may be felt The importance of this has been stressed above

Free fluid may be demonstrated, but it is only likely to be present in a late diffuse peritonitis In earlier stages even when a limited peri tonitis is tending to spread, the amount of free fluid present is not usually detectable by percussion One may infer its presence from spreading tenderness and rigidity

It is worth repeating that rigidity will often give a duller note than the normal, but not the dullness of fluid

SPECIAL EXAMINATION

Radiology This is only used in doubtful and especially in chronic cases including the sub acute type Following the administration of an opaque meal the appendix may or may not be filled and so visualized or not

(*a*) If it can be visualized its appearance must be noted size and evenness of the lumen deformities, e g, stricture filling defects e g as from stercoliths and dilatation, local or affecting the whole organ On palpating it under vision tenderness may be observed and to be due to the appendix it must always be directly related to the appendix If the appendix can be displaced then the tenderness must move with and accompany the appendix If the appendix is fixed the tenderness must be equally fixed *In a provisional diagnosis of chronic appendicitis* due usually to the finding of a tender spot which is compatible with an appendix, the object of the examination is to find out if the clinical tender

spot is the appendix or not If it is, one is justified in accepting the diagnosis 100 per cent

A further point in the visualized appendix is the length of time the barium is retained in the appendix It is customary to regard this as pathological if the period exceeds 48 72 hours, but there is one proviso and that is that the caecum must be empty while the appendix remains filled In chronic constipation the barium may remain in the caecum for longer than 72 hours and a full appendix under these conditions is not necessarily pathological On the other hand, one has found barium still in the appendix, when it was removed a fortnight later

If tenderness is not present at the time of visualization then a diagnosis of pathology must depend on the appearances and the period of retention of barium

(*b*) If it be found impossible to visualize the appendix it may or may not be pathological

The only positive evidence we are then likely to obtain—and it is not beyond criticism—is the demonstration of a localised tenderness with a relation to the caecum consistent with its being caused by the appendix If the caecum can be moved, the tenderness must move with it and retain its relationship to it Such a finding can be regarded as strong circumstantial evidence of appendicular pathology In such cases it is easy to appreciate that the presence of a tender spot clinically is of great help in assessing the radiological findings

It may be mentioned that with the newer methods of filling the appendix its non visualization is regarded as probable evidence of pathology

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Though *carcinoma of the rectum* rarely involves the anal canal primarily, those cases which commence in the lower part of the ampulla are liable to extend by continuity into the anal canal When this occurs the symptoms become modified to resemble somewhat those of *fissure in ano* Whether the carcinoma in its extension gives rise to an ulcerative or polypoid condition growth is always present The symptoms depend therefore on the two conditions of ulcer and growth The ulcer resembles a fissure and the growth is registered as a foreign body in the canal that needs evacuation The patient proceeds to accomplish this, but unfortunately the growth is attached and the result is continuous desire and attempt to evacuate it without success This gives rise to a constant desire to go to stool or tenesmus, and the sphincteric action produces pain quite often as severe as in an ordinary fissure but unrelated to defaecation proper In other words the patient is in continuous trouble from pain and tenesmus and the wretchedness and misery produced are beyond words

(2) *Obstruction* In the presence of obstruction the usual intermittent pain of increased peristalsis may develop especially where difficulty is experienced in overcoming the obstruction, e g where the faecal content has not been modified to permit its passage as by moulding or liquefaction The arrival of some hard resistant substance may have the same effect if its size is greater than that of the existing aperture and it may produce complete obstruction

(3) Infiltration inflammatory or malignant separate or combined Carcinomatous infiltration is the common example of this but with it there is nearly always septic infection While the infiltration of the surrounding tissues gives rise to continuous pain it is likely to be more certain and severe when the nerves of the sacral plexus are involved While the tissue infiltration is likely to give rise to a local pain, the nerve involvement is likely to cause referred pain as well in the distribution of the particular nerves affected The pain is independent of defaecation or peristalsis but it may be aggravated by both

(4) *Piles* Haemorrhoids of themselves are not painful and if there is pain associated with them it may be accepted that there is some complication of them present Strangulation is a common cause of pain Most piles prolapse with defaecation but in most cases the prolapse reduces itself or is reduced by the patient during the subsequent toilet In these circumstances the patient may have some discomfort during the prolapse but no pain

If however, the prolapse is not reduced sphincteric contraction may strangulate them interfering with their blood supply and starting with blocking of the venous return Gross congestion results which may be followed by oedema haemorrhage and thrombosis with subsequent ulceration and destruction and finally secondary infection

SCHEME VIII

RECTAL CASES SPECIAL FEATURES

HISTORY PRESENT CONDITION

In rectal cases it is customary to obtain a history about four points in particular, viz, pain discharge, the character of the stool and prolapse

PAIN

This may be due to a variety of conditions and it varies with its cause

(I) It may be produced by conditions in the anal canal of which the common one is *fissure in ano* This is a small ulcer in the nature of a crack in the mucosa of the anal canal itself As it has the external sphincter underlying it everything is set for a severe spasm from sphincter contraction as soon as the canal is stretched as in the act of defaecation or a digital examination

The usual story is that so long as the bowels do not act, the patient is quite comfortable, but with the act severe spasm occurs producing intense pain, which may last from 4 6 hours The patient becomes afraid to have a bowel movement

Fistula in ano is ordinarily not painful at all At its inception when an ischio rectal abscess is present, pain may be very marked and at this time, before the abscess opens the pain is increased with defaeca tion Once discharge takes place and the tension is relieved, the inflammatory infiltration clears up and pain disappears It is very likely to reappear if the fistula becomes closed at either end and a pocket results in which inflammation of a more acute type sets in again It is once again relieved by discharge of the collection As the fistula usually has an opening into the anal canal as well as in the ischio rectal fossa it calls for notice in relation to a routine investigation of rectal cases

While tuberculous fistulae are those commonly seen by the physicians as a late development in progressive tuberculosis, especially of the lungs they constitute a very small proportion of the surgical cases The latter are pyogenic in origin and are usually the only pathology the patient complains of The outlook is essentially different as the tuberculous ones rarely heal while the pyogenic ones with efficient treatment are all expected to heal As a result therefore there is little if any fibrosis and puckering in the tuberculous cases whereas both are marked in the chronic pyogenic ones

hand with each bowel movement the fissure is split open and a streak of fresh red blood is seen down one side of the stool This is characteristic

In *fistula in ano*, the inner opening is found in the anal canal between the sphincters while the external opening is on the adjacent perineal or buttock skin Continuous purulent discharge often in considerable quantity, comes from the outer opening without any relation to defaecation except that it may be increased by it some small pocketed collection being emptied by the pressure From the inner opening there may or may not be a continuous discharge but there is likely to be some with defaecation when the pus smears the outside of the stool

In carcinoma of the rectum discharge will only appear with defaecation As a result of the infection ulceration and sloughing the discharge is considerable blood stained and purulent often containing broken-down tissue, and it is foul smelling When obstruction is present there is often a good deal of mucus as well In carcinomatous invasion of the anal canal there is usually a continuous considerable bloodstained purulent discharge which is very offensive This is increased with defaecation as the discharge from the carcinoma above in the ampulla of the rectum is added

In the case of piles the only discharge is likely to be bleeding during defaecation The superior haemorrhoidal radicles commence just above the anal canal in the submucosa and pierce the rectal muscle about two inches higher up During the act of defaecation with the straining and contraction of the rectal muscle these radicles which form the piles are markedly congested and are apt to be everted so that they project from the anus The typical haemorrhage arises by bursting of these tense congested veins with the result that the blood is spattered all over the basin It is bright red fresh blood and it is not mixed with the stool In the later stages of piles when thrombosis is likely to have occurred in greater or less degree haemorrhage tends to diminish or even cease altogether

In fissure and haemorrhoids the blood is fresh and red and is not mixed with the faecal matter When bleeding comes from a rectal ulcer, simple or malignant, it may occur at any time and the blood is likely to be retained till a stool is called for It therefore becomes stale and altered by the organisms present If the stool is formed the blood is not mixed with it but should the stool be diarrhoeic it may become intimately mixed in the liquid Otherwise the mixing of the blood with the stool suggests a higher origin such as the caecum the small gut or even the stomach

Character of the Stool

The first thing to be found out is whether the patient has constipation or diarrhoea and in the former event whether the stool is well formed

Such a complication may give rise to extremely severe, continuous pain The pathology will be recognized as that occurring in any case of strangulated tissue

Fissures may sometimes develop between the piles and give rise to pain indistinguishable from that of an ordinary fissure The other associated symptoms of haemorrhoids will probably give an indication of the true pathology

Severity of the Pain The most severe pain is that produced by fissure but, though it may last for some hours the patient is free of it until the next act of defaecation Peristaltic pain is only likely to be present when evacuation may be desired and, when the bowel is empty above the obstruction, pain is absent

In carcinomatous infiltration of tissue, the pain is not necessarily severe but it is continuous and the patient is worn out by it and so unable to stand up to it From the patient s point of view it is likely to be worse than more severe pain which is intermittent Where the nerves of the sacral plexus are involved the pain is likely to be much more severe than in the previous case and although it may not reach the degree of severity met with in fissure at its maximum the ultimate effect on the patient is much more serious as its continuous nature not only wears him out but prevents him from sleeping

The pain of strangulated or ulcerated piles may also be severe, but it is also a temporary event and in due course it clears away It is usually continuous while it lasts

Discharge

Much information may be obtained from the patient in relation to discharge Seeing that we are dealing with an orifice which is associated with mucous membrane the discharge may consist of mucus pus or blood separate or combined In addition the very nature of the bowel contents provides a copious mixed infection including anaerobic and coliform organisms the result being that any discharge may be very foul smelling

Whether the discharge is with or apart from defaecation is an important point

If it originates above the sphincters then it is usually only seen on defaecation unless a fistula communicates with the surface or an incompetent sphincter is present

If the anal canal is involved continuous discharge is likely but not necessary The external sphincter keeps voluntary control of evacuation but in some patients the control is lax and leakage will occur

In fissure as the superficial part of the ulcer is outside the external sphincter there is usually a small amount of continuous purulent discharge but it is frequently unnoticed by the patient On the other

every six or seven days The result is to make matters all the worse as the only hope of a reasonably comfortable evacuation must come from a liquid stool

ANYTHING COMING DOWN WITH OR APART FROM DEFAECATION

Here the patient is usually able to give a clear report except in the case of children when the parents as a rule know of anything there is to describe

A polyp is mostly seen in children and its chief symptom is haemorrhage The mother will often describe the appearance of a small cherry or plum at the anus with defaecation which slips back of itself This type of polyp is usually single and has a long pedicle In adults polypi tend to be sessile and mutliple and do not appear at the anal orifice The commonest things to come down with defaecation are piles and their story, according to the stage they have reached is characteristic The mucous membrane tends to become lax over the projection of the pile and this is a steadily progressive condition

In the early stages the prolapse occurs with defaecation but it disappears automatically At this stage haemorrhage is usually out standing Some time later the prolapse will not return by itself and following the defaecation the patient has to replace it by pushing it back At this stage there is still usually considerable bleeding In the last stage, prolapse occurs without the necessity for defaecation and may take place at any time e g in walking across the street Such prolapse always requires digital replacement At this stage there is often no bleeding at all the piles by this time having become mostly thrombosed but in spite of this the patient s condition is worse than ever before as he has a continuous feeling of wanting to have his bowels moved and he often cannot discriminate between the prolapse and a motion Mentally these individuals frequently show the deepest depression and operative interference becomes urgent

Occasionally with straining a patient may produce a prolapse of the rectum which may be quite large It is most commonly seen in children with bowel irritation worms etc

On the other hand a patient with a carcinoma of the rectum may by straining produce a sufficient prolapse to present the carcinoma at the orifice It is quite uncommon and indicates a loose rectal wall

In the case of fissure the patient may report that he feels a pile projecting at the anus when he does his toilet In such cases the projection is not a prolapse like those mentioned above but is a permanent projecting tag of skin, which cannot be replaced inside the anal canal It arises in the formation of the fissure which is produced by the tearing down of one of the anal valves between the columns of Morgagni the tear extending to the outlet of the anus below the external sphincter The fissure passes up into the anal canal from its base The

or not Where obstruction occurs for any reason, chiefly carcinoma constipation develops and increases with the obstruction This is so important a clinical picture that it has given rise to the saying *If a patient over forty, who has previously had regular defaecation develops constipation suspect a carcinoma of the lower bowel'*

As the obstruction increases the stool tends to be modified and moulded to pass through the stricture so that it decreases in size and becomes pipe stem or tape like in form Should the obstruction continue to increase, this moulding may fail In such cases matters are assisted by the development of inflammatory catarrh above the obstruction with outpouring of mucus and exudate which liquefy the stool The patient is then able to pass the liquid faeces and he reports an attack of diarrhoea

The special feature of the diarrhoea is that there may be 3 6 small stools at short intervals requiring a period of 2 3 hours to empty the bowel Each stool which fails to empty it leaves the patient with the feeling of distention and of more to come It may even amount to tenesmus Mucus pus and blood will probably all be present from the carcinoma if that is the cause Following the attack of diarrhoea the patient may have no further stool for three or four days and the repetition of this sequence of events gives rise to the characteristic story of alter nating diarrhoea and constipation which is so typical of the late stages of chronic obstruction in general, and of carcinoma of the rectum or sigmoid in particular

In carcinoma of the rectum and lower colon the symptoms may start with diarrhoea which usually suggests the irritation of a polypoid growth without obstruction The danger is that it may be diagnosed as mucous colitis , no further investigation carried out and the patient s life lost in consequence The prognosis of this type of case depends mainly on the degree of infiltration of the base of the growth and corresponds with this, i e , the greater the infiltration the worse the outlook and *vice versa* The soft infiltrating polypoid carcinoma is especially likely to disseminate both by lymph and blood stream Where diarrhoea follows progressive constipation it is a late development in a slowly growing scirrhous carcinoma and the prognosis is, therefore bad from the point of view of the time factor but good from that of the type of growth the exact reverse of what is found in the infiltrating fungating variety

One must never forget that a carcinoma may be present but not responsible for the diarrhoea and it is even more easily overlooked in such an event—one has in mind the presence of a carcinoma in a case of proven amoebic dysentery Special care is necessary to avoid irre parable mistakes under such circumstances

As was mentioned the pain of fissure may terrify the patient so much that there may result a constipation so marked that the bowel only acts

speaking anatomical ones The internal piles are those which arise from the radicles of the superior haemorrhoidal veins and are part of the portal circulation They are situated above the internal sphincter When they prolapse and appear at the anus they are still internal piles, though they are projecting externally External piles on the other hand have nothing to do with these They are mostly small skin tags which may have haemorrhages taking place into them When this occurs they are painful blue sessile elevations which cannot be reduced Some of the small haematomas produced may require incision to relieve the tension in them They have no connection with the portal system but are associated with the inferior haemorrhoidal vessels They tend to become more pedunculated after previous haemorrhages into them They may be situated anywhere round the anus

Another type of external pile is the so called sentinel pile This is the tag of anal valve which in the developed fissure is situated at its external end If the fissure is active the sentinel pile indicates its site If the fissure is healed it indicates that there has been a fissure and where it was The sentinel pile is almost invariably situated in the middle line posteriorly

Syphilitic condylomata must be kept in mind in considering these cases The patient often comes complaining of piles There is no history of bleeding, but they are felt outside the anus continuously and cannot be reduced They are seen to be more or less sessile papillomata attached to the peri anal skin and not coming from inside the anal canal They may be present at any or every part of the circumference of the orifice As they are a secondary syphilitic manifestation, other secondaries have usually been noted by the patient

Internal piles when they prolapse are seen to be covered with rectal mucous membrane, which is normally columnar celled as seen in the early stages Later, however when prolapse becomes more or less continuous, metaplasia may take place and the piles become covered with squamous cells resembling skin They have a characteristic *distribution There are three main piles one on each side posteriorly* and one in the centre in front Between each pair of main piles, the tissue in the most marked cases also becomes haemorrhoidal with minor varicosities and these are known as secondary piles

The appearance of the prolapsed internal piles will vary, not only with the type of covering as described above but also *with the con*dition of their circulation They may be bright red if no circulatory interference has taken place or congested blue or nearly black if strangulation has occurred while if this is not relieved thrombosis with ulceration or sloughing and gangrene may result

A polyp may occasionally be seen in a child resembling a bright red cherry or a small plum It usually presents a very thin pedicle

associated history of the pain and discharge will usually suggest the correct interpretation of the story

One cannot over emphasize the necessity of realizing that a patient will almost invariably attribute any rectal symptoms to piles and may resent any investigation as a lot of unnecessary fuss Many a carcinoma has as a result been missed till it was hopeless, by failure to make a proper examination A point of importance may require elucidation in these cases and it is whether there is any abdominal condition associated with the rectal symptoms An excellent example of this may be seen in the case of haemorrhoids which while commonly the result of constipation and straining may arise from cirrhosis of the liver with portal back pressure It is well, therefore, to make sure that the rectal history comprises the sum total of the patient s complaints

PREVIOUS HISTORY

In most of the non malignant conditions there is a likelihood of repeated attacks with temporary relief between them This applies to fissure, fistula and haemorrhoids In the latter case the gradual aggra vation of the condition is unfolded as time goes on up to the present

In carcinoma there is no history of previous attacks but there is often too long a history before the condition is recognized It may be the patient s fault, in that he considers his disability 'only piles and therefore of no great account, or his doctor may be equally casual and not examine him, accepting the patient s own diagnosis It is worth remembering that 80 per cent of carcinomas of the rectum are inoperable when diagnosed

The length of the previous history is also important as, while that of the non malignant conditions may extend over years (it used to be considered that a patient would suffer from haemorrhoids for an average of eight years before having an operation at present the time is about the same though the interval is often partly used in repeated courses of injections) that of the carcinomas is not likely to be long However one has known a patient live for seven years after a colos tomy for inoperable carcinoma of the rectum

PHYSICAL EXAMINATION GENERAL

The general examination calls for little comment It is chiefly a question of how ill the patient looks and whether he is anaemic cachectic or emaciated

PHYSICAL EXAMINATION LOCAL

INSPECTION

Projecting Piles Anything that projects from the anus is not necessarily an external pile as the terms external and internal piles are strictly



Fig 61 Prolapsed internal haemorrhoids Note the positions one anteriorly and two postero laterally



Fig 62 External pile Haemorrhage from peri anal venous radicle with thrombosis Not median in position



Fig 63 Fistula in ano Note multiple orifices usually indicating the internal opening in mid line *posteriorly* The large diameter of the external openings and absence of fibrous tissue contraction and puckering strongly suggest tuberculosis



Fig 64 Fissure with sentinel pile situated mid line posteriorly More swelling and less projection than usual of the pile

which can be seen coming out of the anal orifice A malignant polyp is commonly the result of extension of a carcinoma of the rectum into and through the anal canal, so that a portion of projecting growth is seen In such cases the projection, in addition to presenting the appearance of a carcinoma, is sessile and continuous at its base with the tissue of the anal canal

A rectal prolapse may be present This term is applied to a prolapse of the whole circumference of the mucous membrane of the rectum It is sometimes the result of piles but it may occur primarily or following the extrusion of a polyp The rectal lumen can be seen opening on its apex It is usually blue and congested may be ulcerated and bleeds readily It is often covered with mucus

Evidence of Pruritis Itching in the peri anal region is a most distressing complaint and is much worse to bear than the painful conditions It tends to make the sufferer suicidal It is commonly associated with a sodden condition of the peri anal skin with a dead yellowish white appearance of overgrown epithelium resembling wash leather It frequently shows cracks in the whitish sodden area and there is evidence of scratching as seen by raw marks and bleeding points The milder cases may be associated with worms or haemorrhoids, but often in the worst cases no definite cause can be found

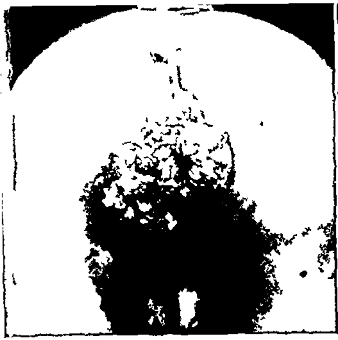
Discharging Sinuses These are commonly associated with *fistula in ano*, which nearly always results from an abscess in relation to an anal valve The closed anal canal forces the pus to be extruded between the sphincters into the ischio rectal fossa resulting in an ischio rectal abscess which ultimately opens externally, while the covering of the anal valve may also ulcerate away

The position of the external opening is usually regarded as indicative of the site of the inner opening If a line be drawn horizontally across the anal orifice on to the buttocks, all fistulous openings behind this line have their inner opening in the middle posteriorly, between the sphincters In front of this line all openings within 1½ inches of the anus have their inner opening radially situated from the outer opening to the anal orifice while those more than 1½ inches from the anus have their inner opening in the midline posteriorly This is almost invariably correct If there are multiple external openings they usually all connect up with a single internal opening

A fissure must also be looked for and as has been mentioned a sentinel pile is the usual indicator (Figs 61 69)

PALPATION

Digital examination including rectal, no probe allowed Both the anal canal and the rectum are to be investigated as well as the surrounding perineal tissues





70

69



Fig 68 Fairly large simple polyp extended from the anus with a long pedicle

Fig 69 Colloid carcinoma of rectal ampulla involving anus

Fig 70 Prolapse of rectum adult female also showing uterine prolapse









Fig 71 (a) Specimen of a carcinoma of the rectum with stricture and marked hypertrophy of the muscle above it

Fig 71 (b) Specimen of a carcinoma of the rectum with typical crater ulcer and a polyp about three inches above it

Fig 72 Specimen of a carcinoma of the recto sigmoid junction showing polypoid type

Fig 73 Specimen of a carcinoma of the rectum showing diffuse involvement of several inches of its length

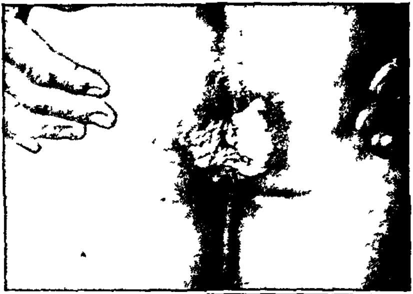


Fig 65 Secondary syphilitic condylomata flat and sessile

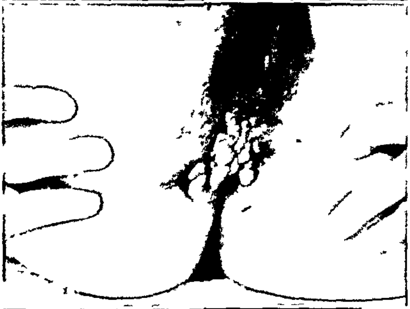


Fig 66 Gonorrhoeal warts polypoid



67a



67b

Fig 67 *a* and *b* (*a*) Lymphogranuloma Early anal involvement (*b*) Lymphogranuloma Advanced anal involvement

crateriform with an irregular craggy surface, a raised hard, everted edge, thickened fixed infiltrated base, and a foul smelling sanious purulent discharge

A point of great clinical importance is that either the mass or the ulcer may be felt on some occasions and not on others This is accounted for by the peristalsis of the gut and straining which may force the growth down sufficiently to be felt at times It indicates that if the possibility of carcinoma is suspected, a single digital examination should not be accepted as final, and either a repeat or a further examination by a proctoscope should be carried out It is also worth remembering that in cases of highly placed carcinoma, ordinarily out of reach of the examining finger, the growth may be felt, not directly but through the rectal wall below it especially if it hangs over into Douglas s pouch

Stricture Whether a stricture will be felt will depend on its height above the anus and the length of the examining finger The possibility of peristalsis bringing it at times nearer the anal orifice is also important

The stricture will present different characters according to its cause

In the simple stricture due to proctitis e g , gonococcal it usually feels like a fine fibrous band round the rectum the rest of the rectal wall being normal The stricture of lympho granuloma inguinale also presents an encircling fibrous band quite smooth to feel but there is commonly diffuse ulceration and scarring below the stricture i e between it and the anal canal The same applies to tertiary syphilitic stricture, which is indistinguishable on palpation from that due to lympho granuloma The Wassermann reaction helps, as both con ditions appear in the same type of patient women about thirty years of age

The carcinomatous stricture, if the tip of the finger can be introduced into it will present the characters of a carcinomatous ulcer with the obstruction i e an ulcer usually accompanies the annular develop ment Sometimes the edge presents polypoid excrescences of growth with induration of their base The rectum below the stricture is not affected except by infiltration (Figs 70 73)

SPECIAL EXAMINATION

Enema An enema is usually only given in those rectal cases where nothing can be felt The first observation is the quantity the patient will take A patient with obstruction at the recto sigmoid junction will rarely take 10 oz unless some of it goes through into the bowel above If this occurs the amount given means nothing The quantity, therefore, is of more value the tighter the obstruction

The result is of importance in that discharge may be returned with it from an ulcerated surface etc The importance of flatus is not of moment in chronic cases Constipated patients will often *retain the*

The first point noticed is whether the introduction of the finger is painful or not Any rectal examination is disagreeable and uncomfortable but pain suggests pathology If it is bad enough, as happens in fissure it may prevent the introduction of the finger altogether, and the examination may have to be done under anaesthesia

The condition of the external (voluntary) *sphincter is noted*

(*a*) It may be normal, as seen in those conditions which are situated above the anal canal in the rectum proper or in those conditions in the canal which are indolent and without tension, e g a fistula which is draining

(*b*) Spasm This is found, *par excellence*, in fissure where pain is so severe that the patient resents any stretching of the canal It is also seen in those cases of carcinoma of the rectum which have extended to invade the anal canal

(*c*) Patulosity This is seen in any *condition of prolapse* whether of piles or of the rectum itself, if it is frequently recurring or persisting It is also seen in some cases of pruritus and sodomy A chronic proctitis may also produce it In cases of pelvic abscess situated at the bottom of Douglas s pouch *patulosity of the anus indicates the impending* rupture of the abscess into the rectum

Uncomplicated haemorrhoids are not felt, though the mucous membrane may feel more lax than normal Inflamed or thrombosed haemorrhoids can usually be felt They are painful and hard

The *upper end of a fissure* may be felt as a small polypoid projection if the patient can tolerate the examination The projection is usually a small area of thickened perhaps fibrous, tissue of inflammatory origin

The *internal opening of a fistula* is usually readily felt as a small dimple with some surrounding hardness *It is within an inch of the anal orifice*, between the sphincters Its situation will vary though the commonest position is in the mid line posteriorly

With the finger in the anal canal and the thumb outside induration or thickening can readily be felt in the ischio rectal fossa particularly along the track of a fistula

Having completed the examination of the anal canal the finger is introduced into the rectum During this part of the examination it is customary to feel the prostrate and to note its characters, and the cervix in the female can also be felt A mass or an *ulcer may be felt* and if so it should be investigated according to the usual routine i e for a mass the consistency surface edge and relations, for an ulcer the surface, edge base and discharge

The commonest example of either of these in the rectum is a carcinoma The characters of a malignant mass are that it is hard and irregular its edge is ill defined and it tends to be fixed to surrounding structures from infiltration The carcinomatous ulcer, on the other hand is usually

SCHEME IX

HERNIA IN GENERAL SPECIAL FEATURES

Inguinal hernia is chiefly considered as it is the commonest type met The sac of a hernia may be congenital or acquired

(*a*) Where the sac is congenital the story is frequently given that the hernia reached its full size the first time it appeared or very rapidly did so There is often very little discomfort with it

(*b*) Where the sac is acquired there is no pre formed sac and consequently something is very often felt to give way, in straining and there is usually a good deal of discomfort or actual pain It is felt locally as it is due to stretching of the parietal serous membrane As a rule it is quite small when first noticed and slowly increases In some of these cases a small swelling the size of a walnut first appears which may not be a true hernia at all but a pilot i e a subperitoneal lipoma or lobule of fat which is first forced through the aperture in the abdominal wall to be followed later by a peritoneal sac

A point that sometimes arises in acquired hernia is whether any bruising was noticed at the time and the site of its first appearance, from tearing of the supporting structures While the presence of bruising would strongly favour a true acquired hernia it is well to bear in mind that it is rarely seen in any type The development is commonly a gradual stretching of the site rather than an actual rupture of the tissue

A pre formed sac is an undoubted predisposing factor in the occurrence of hernia but it is the act of straining which is the direct cause of it and so even where there is a congenital sac compensation is usually paid to the workman

A most prominent predisposing cause of hernia in middle and later life is the loss of muscle tone the result of diminishing physical activity It is typically seen in the lower quadrants of the abdomen where marked bulging occurs running obliquely and parallel to Poupart s ligament It is especially important in inguinal hernia should the origin of the internal oblique from Poupart s ligament be deficient

HISTORY PRESENT CONDITION

Duration Even where there is a congenital sac no hernia may appear for years indeed it may never appear Two factors especially control this the smallness of the neck and the muscle development surrounding it The strain which ultimately produces it may have been experienced for years Such a hernia therefore may be of short or long duration In the

enema, perhaps more than one, and no information can be obtained from it under these circumstances

Barium Enema and Radiography This is of more value above the recto sigmoid junction than in the rectum itself, and obstruction irregularity filling defects etc , are looked for The usual word of warning must be given in relation to filling defects Where doubts exist as to their causation, antispasmodics should be administered and the patient re X rayed to differentiate between functional (spasm) and organic conditions

Proctoscopy and Sigmoidoscopy These are of special value where the pathology cannot be felt A preliminary wash out is essential for a good view An important part of the examination is to get a snip of a possible carcinoma or other pathological focus for microscopic examination It is important to remember that if the gut is fixed at the recto sigmoid junction, the sigmoido cope may not pass and the possibili y of perforating the bowel has to be kept in mind

Abdominal Examination While, in rectal cases, the abdomen is usually of secondary importance, the history may point to abdominal involvement either ante dating or post dating the onset of rectal symptoms It is advisable in most cases to examine the abdomen for evidence of pathology before commencing on the local rectal investigation As has been mentioned, the condition may be primarily an abdominal one or extension of disease viz , carcinoma may give evidence of spread e g to the glands, liver or peritoneum, with jaundice, free fluid, etc Evidence of obstruction is frequently manifested in the abdomen in the gut above a carcinoma The possibility of enlarged glands in the left supra clavicular fossa must always be borne in mind in cases of abdominal carcinoma

hernias are especially liable to adhesion formation and they rapidly become irreducible It is probably due to the lower garments being suspended from the waist though in former times corset pressure was mainly responsible

Is the Patient able to Reduce it? If he can do so it means that the contents are free from adhesions if he cannot, it may be that he has never tried On the other hand, if he has tried and failed it strongly suggests an adherent irreducible hernia but this is not necessarily so as the doctor may subsequently be able to reduce it when the patient has failed At the same time it is well to remember that the patient sometimes can reduce it when the doctor cannot and it is advisable therefore to let him try first if the doctor is perhaps lacking in con fidence or experience

Does the Patient wear a Truss? If so, is it efficient? The function of the truss is to exert pressure on the aperture through which the hernia protrudes after the contents have been reduced in order to prevent their subsequent escape from the abdomen If properly applied and properly fitting it may carry this out efficiently With the hernia properly controlled it is sometimes hoped that the pressure of the truss pad may lead to adhesions at the neck of the sac and so obliterate it Should this occur, a cure is the result Unfortunately the result is often much less happy The pressure of the pad may lead to fibrosis either in the sac or outside it and if the contents are not reduced they may develop adhesions and so the hernia becomes irreducible or strangulation may even occur

A further important adverse effect is seen by pressure on the muscles about the neck of the sac and also from lack of the use of them The muscle tissue partly atrophies and partly is replaced by fibrous tissue and the abdominal wall is correspondingly weakened This may prove a very adverse circumstance if the patient should wish to give up the use of the truss or decide on operation

A perfect truss may be expected to be efficient but the movements and activities of the patient and frequently his casual application of the truss may permit of the contents coming into the sac and if then the truss is retained adhesions are almost certain to develop and strangulation is not frequent

Quite often in recommending operation it is not the truss but the patient s inability to use it that weighs chiefly with the surgeon At the same time in hot climates the wearing of trusses is apt to be very irksome and even lead to irritation and excoriation

PREVIOUS HISTORY

Is there any History of a Hernia having been present in Childhood? Quite frequently there is such a story in the case of inguinal hernias the

case of an acquired sac, the essential feature is the loss of muscle tone which usually comes with advancing years and the tendency to take things easily and become more sendentary This is supported by an increased development of fat, including the abdominal so increasing the intra abdominal tension On account of the accompanying dis comfort as it increases its duration is usually short, before medical advice is sought

Circumstances of First Appearance Some straining act or effort, perhaps of special severity, is usually given as the cause At work, it is the lifting pushing, etc, entailed, which is blamed but straining from chronic constipation, urinary difficulty or cough may equally well be responsible The former entail compensation, the latter do not

Any Evidence of Bruising As referred to above, the presence of bruising strongly favours the absence of a pre formed sac, but it is not commonly seen even in these cases, and therefore its absence must not be taken as definite evidence of the presence or absence of a pre formed sac

Size on First Appearance A hernia which is large on its first appearance, is unlikely to be truly acquired in other words, there was pretty certainly a pre formed sac, e g an inguinal hernia which extends right into the scrotum when it first comes down, may be taken as being into a patent funicular process In the ordinary umbilical hernia of adults there is no perforated sac and the hernia commences as a small nodule very often at first simply a protusion of extra peritoneal fat

Variation since its First Appearance This is usually a question of size and the tendency is for it to increase In the cases with acquired sacs, the increase is usually slow and gradual whereas with a pre formed sac the hernia may be quite large from the start and if so it occupies the whole of the sac and it may remain more or less stationary for a considerable time In the case of the umbilical hernia it tends not only to increase in size but also to become loculated The loculi are separated by dense fibrous bands, the result of irritation usually mechanical pressure over its surface

In the inguinal and femoral regions there is usually only an increase in size in the case of the inguinal hernia the increase being associated with a steady progress towards the scrotum, along the cord In the case of the femoral the increase is at first forwards and slightly down wards, and then it turns outwards towards the anterior superior iliac spine

Does it Disappear at Night? When the patient lies down the intra abdominal pressure is reduced especially in the lower abdomen and if the contents are free in the sac they will return automatically into the parent peritoneal cavity Should this not happen, it strongly suggests that the contents are adherent in the sac and therefore could not be reduced without the sac itself going back at the same time Umbilical

the predisposing causes e g chronic bronchitis prostatic disease with renal failure etc

PHYSICAL EXAMINATION LOCAL

Inspection

Is there a Swelling at any of the Hernial Sites? As a rule the patient will indicate the suspected site but in many cases when the patient comes for examination there is no swelling present If there is none, get the patient to stand and cough, or in the case of a child get him to run about Crying readily produces the hernia, as it is a common accompaniment of a medical examination In this case it is helpful

If a swelling is visible note its situation size and shape The situation is usually more or less characteristic of the particular type

In the congenital umbilical hernia due to imperfect closure of the lower mid abdominal wall, the upper limit of the aperture is fixed by the placental vessels running up to the liver, while the lower limit may be anywhere from this to the symphysis pubis It is known as exomphalos and the abdominal contents can usually be readily seen through the transparent sac

In the infantile umbilical hernia the umbilical cicatrix occupies its apex It is usually small in size In the adult umbilical hernia the umbilical cicatrix is usually at its lower border or beneath it When small these are rounded and may not be true hernias but only extrusions of extra peritoneal fat As they increase in size they tend to become lobulated

In the inguinal region, the first point to note is whether the hernia is above or below Poupart s ligament The inguinal hernias are above it, the femoral below The inguinal hernias vary in their shape according as they are direct or indirect and how far they have progressed towards the scrotum

The direct inguinal hernias usually present a rounded bulge which comes directly forward and occupies the inner end of the inguinal canal They may extend through the external ring but they rarely project far and do not reach the scrotum Consequently they are rarely large

The indirect inguinal hernias project through the internal abdominal ring pass along the inguinal canal in the cord and then proceed towards the scrotum still in the spermatic cord They lie obliquely and are often referred to as oblique hernias They may reach a very great size when they become scrotal

The femoral hernias lie below Poupart s ligament and come out through the femoral canal They appear therefore below the inner end of Poupart and at first present as small rounded swellings pointing directly forwards As they enlarge they tend to turn outwards towards

swelling having perhaps been present for six months in infancy and then disappeared If then in adult life a hernia develops, the likelihood is that there is a patent funicular process and also that it has a narrow neck which prevented its re appearance for so long This carries with it the likelihood of strangulation occurring Under these circumstances quite a number of such cases strangulate on the first appearance of the hernia

Has the Hernia always been Reducible? This is important because if there have been previous occasions on which he could not get the hernia back, it also means that the neck is small

In the direct inguinal hernia in which we have an acquired sac protruding medial to the internal abdominal ring the sac has almost invariably a wide neck reducibility is easy and regular, and strangulation correspondingly rare The same applies to the so called sliding hernia in which the posterior abdominal wall slides down into the inguinal canal carrying with it the viscera attached to it Reduction of the hernia is easy but it is exceedingly difficult to keep it reduced

Any Attacks of Irreducibility especially suggesting Strangulation? As has been mentioned irreducibility may have been due to a small neck of the sac and there may have been few or no symptoms associated Irreducibility may also result from adhesions of the contents to the sac and this may be present without any symptoms

Should, however strangulation of the contents occur then the irreducibility is accompanied by urgent symptoms the general being a varying degree of shock or collapse the local depending on the viscera involved Two main types of case present themselves (1) Those with acute intestinal obstruction (2) Those without it

Where acute intestinal obstruction occurs gut is certainly included in the structures involved the urgency of it depending on whether small or large gut is affected The usual symptoms are produced viz pain vomiting arrest of faeces and flatus Where there is no evidence of acute intestinal obstruction in the presence of strangulation it means that structures other than gut are involved e g omentum testis ovary or, if gut be affected only a portion of the lumen is nipped e g, Richter s type of hernia

Should attacks of this nature be recorded and the patient have got over them some permanent damage from vascular interference may have resulted such as fibrosis leading either to adhesions and permanent irreducibility of the hernia or perhaps to stricture of the gut with chronic partial obstruction These results depend on the tightness of the strangulation and its duration

PHYSICAL EXAMINATION GENERAL

In the absence of strangulation no interference with the patient s general condition is likely as a direct result of the hernia, but he may reflect



78

Fig 78 Hernia belly General bulge of lower abdominal quadrants from muscular atony There is no hernia through the appendix scar



79a 79b

Fig 79 *a* and *b* Indirect or oblique inguinal hernia (*a*) Swelling limited to inguinal canal (*bubonocele*) (*b*) On forced expiration (coughing) the swelling extends outside the superficial inguinal ring



80

Fig 80 Direct inguinal hernia



81a 81b

Fig 81 *a* and *b* Complete funicular indirect inguinal hernia *a* Without straining *b* With straining



74



5a



75b

Fig 74 Congenital umbilical hernia (exomphalos) Shadow of liver seen at upper end of sac

Fig 75 *a* and *b* Infantile um bilical hernia Note umbilical cicatrix on appex

Fig 76 Adult umbilical hernia Note the umbilical depression below the swelling

Fig 77 *a* and *b* Very large adult umbilical hernia



76



77a



77b

the anterior superior iliac spine They do not usually become very large (Figs 74 88)

Condition of the Overlying Skin Pressure is chiefly responsible for changes in the overlying skin either from a truss pad or clothing The pad is liable to lead to atrophy of the subcutaneous fat with fibrosis and thin atrophic and wrinkled skin Over an umbilical hernia the skin is likely to be stretched and atrophic and it is often scarred or ulcerated These changes strongly suggest the possibility of adhesions and probable irreducibility

PALPATION

The swelling must be palpated as usual for its consistency surface edge and relations

The *consistency* varies considerably with the contents and their condition Most hernias are quite soft without tension The commonest content is the lower ileum in inguinal cases It is unusual to be able to feel the individual loops but gurgling is often made out from the manipulation of the gas and fluid contents Omentum is soft and doughy but if there has been any interference with its blood supply, it is apt to become harder from fibrosis Solid contents such as the testis or ovary will have their normal firmer consistency An irreducible hernia may be soft also but attempts at reduction are likely to produce considerable increased tension A strangulated hernia is hard and resistant, and irreducible

The *surface* of the hernia depends on the sac and its contents In the simple sac of the inguinal and femoral hernias the surface is smooth and rounded, although in the larger ones lobulation may be produced by the contents loops of gut and masses of omentum In the umbilical hernias as they increase they become lobulated from loculation of the sac and the filling of the separate loculi with contents which commonly become adherent and irreducible The fine lobulation of the normal omentum may be felt

The *edge* of the hernia depends on its site and size Small hernias in all situations in fat patients all have an ill defined edge As they become bigger and more projecting they tend to a much better definition An inguinal hernia, e g when it passes on through the inguinal canal and down the cord may be so well demarcated that it can be lifted up with the cord away from the surrounding structures

The *relations* of the swellings are numerous some common to all in view of their formation and some limited to special hernias in view of their anatomy

Expansile Impulse on Coughing Any cavity which has a bulge on, it will present this feature If pressure is increased in the parent cavity, automatically there is an increase of the pressure in the small one

82



Fig 82 Bilateral scrotal hernia (funicular—testes can be seen below the hernias)

Fig 83 Left scrotal hernia (sliding type) containing sig moid which shows sacculi (barium enema)

Fig 84 (a) Complete labial indirect inguinal hernia due to patency of the canal of Nuck (b) Hydrocele of termi nal non obliterated portion of the canal of Nuck situated in the labium majus (case of Dr D Crichton)

Fig 85 Large right extra parietal interstitial oblique inguinal hernia sac reaching anteriror superior iliac spince superficial to external oblique Testis ectopic

Fig 86 Undescended ectopic testis with testis and funicu lar process outside superficial ring and lying on the external oblique Hydrocele of funicular sac present



86



83



84a



84b

the neck, if complete may cure the hernia by sealing off the sac from the abdominal cavity

Is there a Gurgle on Reduction? The presence of a gurgle on reduction means that the hernia contains gut and that the latter has gas and fluid contents The absence of a gurgle usually means that the contents of the sac are omentum The nature of the contents is important in that should strangulation occur the outlook is infinitely more serious where gut is involved than where omentum or perhaps a testis is affected Occasionally reduction of a hernial swelling with gurgling may be misleading In a case of ruptured peptic ulcer, with free gas and fluid in the peritoneum a hernia which may be present is readily filled with this gas and fluid Reduction is easy and occurs with a gurgle, but the failure to recognize the associated pathology is likely to be fatal There are usually abundant evidences of the source of the patient s serious condition

Is Pain or Tenderness present in the Hernia? Neither is present in an uncomplicated hernia though both may be present usually in a mild degree during a noticeable increase in the size of the hernia due to the stretching of the parietal peritoneum forming the sac Pain and tenderness however strongly support the probability of strangulation being present in greater or lesser degree

Translucency In an adult a hernia is not translucent in a child it frequently is This is essentially a matter of the amount and thickness of tissue involved In adults translucency means clear fluid and usually indicates a hydrocele

In an inguinal hernia after its reduction it is important to note the condition of the spermatic cord and the superficial inguinal ring Should the hernia have extended outside the canal towards the scrotum the cord will be found to remain thickened after the hernia is reduced This is natural as it still contains the empty sac in addition to its normal structures In such a case also the superficial ring is enlarged compared with its fellow of the opposite side These observations are specially important in those cases where no hernia is down and it cannot be produced during the medical examination When taken in conjunction with the history of the swelling coming and going these points make the diagnosis of hernia certain i e, a thickened cord and a large superficial ring

A further point is the possibility of being able to introduce the finger into the superficial ring and perhaps into the abdomen

This is only likely in direct inguinal hernias and those large indirect ones where the inner ring is gradually pulled medially to approximate to the superficial one and where the superficial ring is very large Otherwise the finger cannot be fully introduced It may be possible to feel the inferior epigastric artery pulsating and if so its relation

resulting in its expansion. This shows itself as an expansile impulse as the whole of the bulge increases in size It is present in all serous cavities e g, *cerebro spinal system, joints etc and also in the hollow* muscular systems associated with sacculi or as they are often called, diverticula' The only reason we employ coughing is because it is the simplest and readiest way of increasing the intra abdominal tension Crying is the usual source of the increased tension in young children

The expansile impulse necessitates a free communication between the two cavities and consequently, in strangulated hernias where there is usually a tight rigid constriction at the neck of the sac, it is absent It is naturally absent in those swellings which do not communicate with, in this case the abdominal cavity

In the case of an expansile impulse associated with dilated and varicose veins, e g a large varicocele, the impulse though expansile, is also in the nature of a thrill and it is characteristic

Reducible or not Partly or Wholly? A simple uncomplicated hernia is reducible Several features may render it partly or wholly irreducible *If one fails to reduce it, it is well to be sure that the patient cannot* reduce it either—he often can when the doctor cannot If it be reducible, it may be so only in part This suggests that some of the contents are free while others are adherent, and only the free portion is reducible Adhesions are usually of the contents to the sac but they may equally prevent reduction if they are between the contents themselves producing clumping, or between the sac walls producing loculation.

A further cause of irreducibility is seen in the omentum where with vascular interference it may become like a champagne cork the expanded portion in the sac being partially fibrosed or cystic or having undergone fatty increase Sometimes irreducibility is only apparent, as the method of attempted reduction may be wrong

The proper way to reduce a hernia is to do so by pushing back first the part that came down last i e we start at the neck and work towards the fundus of the sac Both hands are used That employed at the neck manipulates back the contents immediately adjacent to the abdominal cavity while the other hand keeps up a constant pressure on the hernia as a whole *The pressure must be exerted in the direction* in which the hernia has come down e g in inguinal hernias upwards and outwards *and then backwards in femoral hernias backwards* and upwards In umbilical hernias the pressure is mainly backwards but the direction may have to be modified as the result of loculation

While a non strangulated irreducible hernia is usually soft in consistency and has an expansile impulse on coughing, a strangulated hernia is not only irreducible but it is hard and has no expansile impulse on coughing.

Where the contents of a hernia are entirely omentum adhesions at



92



93b



93a

Fig 92 Chondro sarcoma of ilium projecting in inguinal region

Fig 93 *a* and *b* (*a*) Sarcoma of ilium projecting above Poupart s ligament (*b*) Two years and eight months later



87



88

Fig 87 Femoral hernia

Fig 88 Large femoral hernia extending upwards and laterally towards the anterior superior iliac spine



89



90



91

Figs 89 93 illustrate the differential diagnosis of inguinal hernia

Fig 89 Superficial inguinal lipoma

Fig 90 Tuberculous psoas abscess pointing above Poupart s ligament

Fig 91 Double tuberculous psoas abscess pointing above Poupart





93b



93a

Fig 92 Chondro sarcoma of ilium projecting in inguinal region

Fig 93 *a* and *b* (*a*) Sarcoma of ilium projecting above Poupart's ligament (*b*) Two years and eight months later



87



88

Fig 87 Femoral hernia

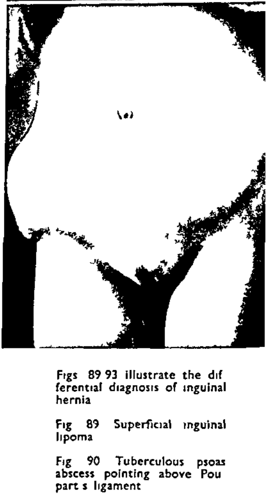
Fig 88 Large femoral hernia extending upwards and laterally towards the anterior superior iliac spine



89



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Figs 89 93 illustrate the differential diagnosis of inguinal hernia

Fig 89 Superficial inguinal lipoma

Fig 90 Tuberculous psoas abscess pointing above Poupart s ligament

Fig 91 Double tuberculous psoas abscess pointing above Poupart

to the neck of the sac will decide whether the hernia is direct or indirect In the direct hernia the vessel is lateral to the neck in the indirect, medial to it When the *swelling is reduced, if it be a hernia one should be able to keep it reduced* with the patient standing by a finger placed over the *aperture through which it came On releasing the finger the* hernia will reappear from above downwards

In the case of fluid in a hernial sac this also may be readily reducible, but with the patient standing and a finger over the aperture reappearance will not be prevented as the fluid seeps past the finger It re accumulates *at the most dependent part* and therefore the swelling reappears from below Where the swelling is vascular in origin, e g, in varicocele it may be reducible *when the patient lies down* but, again with the patient standing and a finger over the abdominal ring the swelling cannot be prevented from reappearing as it is filled from the arterial supply It also fills up from below

In differentiating an inguinal from a femoral hernia as a rule the former is obviously above Poupart s ligament and the latter below it and the direction of the ordinary inguinal hernia particularly is characteristic *There are cases however where there is legitimate doubt*, and the simplest means of distinguishing between them is an attempt to get the tip of the finger on to the pubic spine from the lateral side of the hernial swelling passing deeply to it

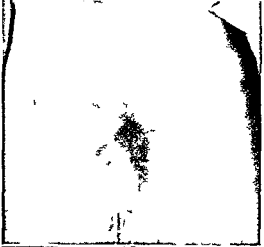
In the case of an inguinal hernia this is usually easily attained the cord containing the hernia being readily lfited and displaced In the case of the femoral hernia on the other hand it is impossible of achievement as the sac cannot be *lifted* forward *In the inguinal cases* this applies to those which have extended beyond the superficial ring *It is worth while repeating for the sake of emphasis that a hernia* which has been painless, free from tenderness soft and reducible and has become painful tender hard and irreducible is strangulated (Figs 98 101)

Percussion

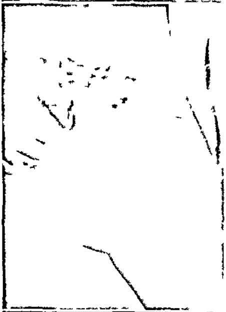
Resonance may be obtained over a hernia but it is not usually found in adults In children on the other hand it is quite common *It means* that the contents of the sac are gut with gaseous distension This is most likely to be present when the colon is *involved though the lower ileal* coils may also contain some gas from the presence of *B welchii*

ABDOMINAL EXAMINATION

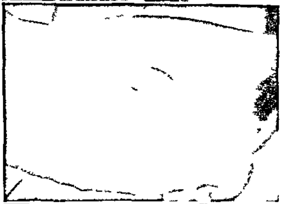
An abdominal examination in cases of hernia will include a search for any condition which might increase the intra abdominal pressure and so lead to the development of the hernia This has been referred to under the general examination At this juncture however the chief



94



95



96



97

Figs 94 101 illustrate differential diagnosis of femoral hernia

Fig 94 Lipyma of Scarpa s triangle

Fig 95 Lipoma below and medial to femoral hernia site

Fig 96 Bilateral common femoral aneurysms (syphilitic) Right one leaking

Fig 97 Rupture of adductor muscle

Fig 98 Bilateral psoas abscess, pointing below Poupart s ligament

Fig 99 Granuloma inguinale commencing to break down

Fig 100 Secondary sarcomatous inguinal gland Primary focus *in* opposite *innominate* bone Left inguinal gland had disappeared under radiotherapy

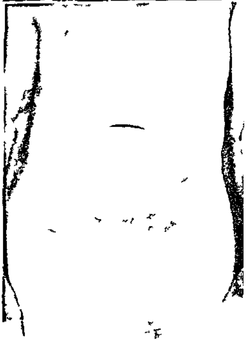
Fig 101 Glands in both groins (part of generalisation in a case of lymphatic leukaemia)











SCHEME X

SCROTAL SWELLINGS SPECIAL FEATURES

The commonest scrotal swelling is a hernia which has already been considered and apart from this others encountered may be classified as acute or chronic The acute ones are inflammatory and traumatic swellings The chronic ones are chronic inflammatory or neoplastic swellings hydrocele and varicocele

HISTORY PRESENT CONDITION

Duration As elsewhere swellings due to injury or the more acute inflammations are likely to be of short duration while those of chronic nature which include chronic inflammatory conditions and all neo plasms besides hernia and hydrocele, are more prone to be of long standing At the same time the patient s attention may have been drawn to a swelling only a short while before he comes for advice perhaps because of some sudden change in it due to injury or haemorrhage A painless swelling of the testis is at first apt to be regarded by the patient with satisfaction or even pride rather than distrust or fear and so it may be a long time before he decides to have it investi gated A hydrocele of the cord e g is often regarded by the patient as a third testis rather than an indication of pathology

Circumstances of Onset In quite a number of conditions e g, tuberculosis neoplasms and primary hydrocele the patient is unable to assign any cause to the swelling especially when there is no pain The same applies to varicocele On the other hand e g, in hernia he will quite often say that it followed some strain such as coughing lifting a heavy weight or constipation One must not forget the quaint habit many patients have of attributing an acute gonorrhoeal epididymitis to a strain or the use of a dirty lavatory At the same time in many of these cases the patient associates the epididymitis with a previous urethral discharge Mumps may have preceded the swelling of orchitis especially in epidemics where up to 25 per cent of the patients may be so affected The story of a cough mav be that of tuberculosis of the lung while in syphilitic orchitis which may follow many years after the primary in fection the patient is apt not to associate the two

Whether the Swelling began in the Scrotum or the Groin? This is an important feature in differentiating between swellings entirely limited to the scrotum and those which involve the inguinal region and possibly

investigation of local interest is the search for any evidence of intestinal obstruction This will naturally, vary as to its acuteness or chronicity, its completeness or partial nature, according to the pathological conditions found in the hernia

which may be suggestive The progress of the condition is simply one of increasing size which may ultimately lead to the recession and disappearance of the penis with micturition difficulties

In the case of secondary hydrocele which may result from and follow any other disease of the testis or the epididymis the patient cannot differentiate it and it will simply be included in his story of increasing size for part of which it may be responsible

In the case of varicocele the usual story is that it was not noticed at all but if it was then it was after puberty In most cases it is not complained of by the patient but is found on routine medical examination If it was noticed by the patient, progress may be by way of steady increase in size though normally it remains stationary

Presence of Pain In many scrotal swellings e g hernia hydrocele and simple neoplasms pain may be absent throughout their course and should it occur it suggests some complication

When pain is complained of it is important to know whether it preceded or followed the discovery of the swelling where it started and where it settled

In the acute inflammatory conditions the pain usually precedes the swelling and draws attention to it In ascending infections it is likely to be felt first in the groin and then to extend into the testis and remain there Where the testis is primarily involved the pain starts in the testis and stays there

In the chronic inflammatory conditions e g tuberculosis and syphilis pain may be absent in the less active cases or it may precede or follow the swelling In the former case it will draw attention to the swelling Where pain follows the swelling it is commonly due to some increased activity usually with extension and breaking down of the focus It is felt in the swelling

In neoplasms it follows the swelling as a rule and is a late development It may be due to infiltration or haemorrhage In the case of haemorrhage which is more likely to occur in rapidly growing tumours it may occur with the production of pain and so bring the patient s notice to the swelling This is not the usual story which is very often that of the increased weight of the testis

In hernias pain is only felt when something is wrong usually strangulation In such cases the pain is first felt in the hernia when it is due to the acute stretching and distention of the sac while later it is often felt in the abdomen especially where the gut is strangulated and the pain is referred from the obstruction to the umbilicus or below it

It has been previously observed that especially in the earlier history of a hernia while it is perhaps rather rapidly increasing in size the stretching of the sac which is parietal peritoneum may give rise to pain and tenderness

the abdomen In the case of hernia the story is usually of a start in the groin and extension downwards to the scrotum

In most inflammatory and neoplastic conditions of the testis and the epididymis e g, tuberculosis gumma, etc, the swelling was first noticed in the scrotum Even in the case of acute epididymitis due to gonorrhoea where the infection spreads from the urethra, along the vas to the testis the swelling starts in the scrotum though the patient will often describe the pain as beginning in the groin and passing from there into the testis There may be some slight swelling in the groin before the testis is involved

In rapidly growing neoplasms especially in children extension by continuity is liable to involve the cord and so the swelling extends up into it with resultant thickening

Story of Progress One feature of progress has been mentioned under the previous heading viz whether it extends from the testis up the cord or commences above in the groin and extends to the testis

In acute inflammatory conditions, whether due to mumps, sepsis or gonorrhoea the patient presents himself quickly on account of the pain, *which may be severe In mumps and gonorrhoea the swelling* is likely to subside in due course in sepsis quite a proportion go on to suppuration with abscess formation and later discharge of it, some with destruction of the testis In all acute conditions the scrotal skin is likely to be widely oedematous In chronic inflammatory conditions, e g tuberculosis epididymitis or gummatous orchitis the patient frequently only presents himself after the focus has broken down and is discharging on the surface of the scrotum In such cases it is customary for tubercle to break through the skin posteriorly because the epididymis is involved and for the gumma to break through anteriorly because it is the body of the testis that is affected It must be remembered that this sequence of events may be reversed in the not infrequent condition of inversion of the testis where the epididymis runs up the front instead of the back of it

A neoplasm if it extends through the scrotal skin, may break down at any place though it is not common because of the capacity of the scrotum to expand and accommodate even huge growths It is more commonly seen in the rapidly growing infiltrating neoplasms, e g, seminoma in children The usual story of a neoplasm is one of steady increase in size though it remains the same type of swelling On the other hand there may be a sudden increase in size should haemorrhage occur and this is more likely to take place in the more rapidly growing cellular and vascular tumours It is accompanied by considerable pain due to tension increased by the bleeding

In the case of primary hydrocele the patient is unable to give any history of differential value except perhaps the very long duration

PREVIOUS HISTORY

Previous Trouble with Micturition This covers a variety of conditions which have mostly been mentioned in connection with the history e g urethritis prostatis or cystitis in relation to ascending infections, prostatic obstruction or stricture of the urethra in relation to the production of hernia and the possibility of the urinary bladder being in the neck of the hernial sac

Occasionally a tuberculous testis follows tuberculous infection of the kidney and in such cases the urinary symptoms of the kidney involvement precede the swelling of the testis

Attacks of Pain and Vomiting This is strongly suggestive of attacks of strangulation in a hernia which have righted themselves partially or completely Changes in the swelling usually occurred at the same time

Any Formation of Abscesses and their Discharge This rarely occurs in gonococcal infections but is common in septic epididymo orchitis The abscess may discharge over the epididymis but it often does so over the body of the testis Both are usually involved and the body of the testis is often destroyed

In tuberculosis, abscess formation occurs in the epididymis and its discharge is over it i e usually at the back of the scrotum

In gummatous orchitis it is the body of the testis which is almost invariably involved and consequently when it breaks down it does so over the body i e as a rule in front of the scrotum

Pain or Stiffness in the Back This may indicate that the condition is not purely a scrotal one It may suggest a renal lesion primary or secondary It may also suggest tuberculosis of the spine with abscess following the cord into the scrotum A renal tumour may obstruct the spermatic veins and lead to a varicocele The patient may present himself for that rather than for pain and it is of particular note should it occur on the right side as the ordinary varicocele is almost always left sided

Tapping of a Hydrocele In large hydroceles of long duration whether primary or secondary their great weight frequently drives the patient to seek relief by tapping The story, therefore of its occurrence makes the diagnosis of hydrocele positive but it may still leave the question of possible underlying pathology open

PHYSICAL EXAMINATION GENERAL

As usual the general appearance and condition of the patient may reflect the local pathology e g, inflammatory fever cachexia loss of weight etc There is nothing that calls for special consideration

In the case of varicocele while most are symptomless pain of an aching character may be complained of in hot weather with relaxation of the scrotal and vein walls and their increasing congestion Otherwise pain may be associated with unsatisfied sexual stimulation

Does the Swelling Diminish in Size or Disappear on Lying Down? Such an observation is only likely to be made by the patient in reducible hernia varicocele and those cases of hydrocele in which the sac communicates with the abdominal cavity i e the so called congenital hydrocele

It is also true of those rare cases of tuberculous psoas abscess in which it may pass through the inguinal canal into the scrotum The same underlying condition is present that the scrotal swelling must communicate with the abdominal cavity

Can the Patient Reduce the Swelling into the Abdomen? This is likely to be positive in the same class of case as those described in the previous paragraph Its main implication is in connection with hernia whether it is reducible or not

Is there any Trouble with Micturition? Many scrotal conditions are associated with micturition troubles and it is important to know whether these occurred before with or after the appearance of the swelling

In the acute ascending infections whether gonococcal or septic micturition disturbance precedes the swelling In the former a posterior urethritis follows the anterior with marked frequency of micturition and pain both during and at the end of the act in the latter the symptoms of a septic prostatitis or cystitis precede the epididymitis

In tuberculous epididymitis frequency of micturition is most commonly an indication of spread of the tuberculosis to the kidney though it may also mean involvement of the prostrate or bladder base It follows the appearance of the scrotal swelling and is late and serious

In syphilitic scrotal manifestations there is no interference with micturition

When the urinary bladder is drawn into the inner side of the neck of a hernial sac especially an inguinal hernia urinary symptoms may develop e g increased frequency or desire to micturate especially when the patient is up and about It is seen particularly in the sliding type of hernia where the parietal peritoneum is gradually pulled down to take part in the formation of the enlarging sac The bladder comes with that on the medial side of the hernial neck

Where prostatic obstruction has led to straining and so precipitated a hernia the prostatic symptoms precede the development of the hernia They are chiefly increased frequency at night with loss of force in the stream

be quite unaware of any carcinomatous development and he seeks medical advice because of the increased difficulty he has with his hernia, which previously was controllable

Reducibility of the swelling on lying down is again a usual feature of uncomplicated hernia but it will so occur in varicocele, possibly in psoas scrotal abscess and in congenital hydrocele

A point of importance occurs with the congenital hydrocele where quite a proportion of them have a very small communication with the peritoneal cavity In such cases, reduction takes place, but very slowly and as a result of the small aperture no impulse occurs on coughing and no hernial protrusion of gut or omentum is met The sac, therefore persistently contains only fluid and this recurs very slowly after reduction

Are any Inflammatory Signs or Sinuses present? In acute inflammatory conditions redness swelling and oedema of the scrotal wall are likely to be present In chronic inflammatory conditions of the testis, however, no redness or oedema is seen unless the process is infiltrating the scrotal wall and becoming superficial Sinuses, however, following breaking down and discharge of the foci will be obvious and the position must be noted as indicating their origin and often their pathology This has been referred to above

Condition of the Overlying Skin In the inflammatory conditions as mentioned above signs of inflammation may be present On account of the laxity of the scrotal wall very great swelling may develop and oedema may be very extensive

The skin may be markedly stretched and shiny from neoplasms of the testis but, on the other hand both inflammatory and neoplastic conditions may infiltrate the scrotal wall and involve the skin Should the skin then break down the inflammatory conditions usually present an excavating cavity while the malignant conditions tend to fungate and show growth in excess of destruction This fungation must be differentiated from the so called hernia testis' which may be seen in inflammatory cases, and is usually a protrusion of inflammatory granu lation tissue through the aperture In the absence of inflammatory signs, the increased vascularity of the underlying condition may be judged by a marked dilatation of the veins of the scrotal wall (Figs 102 125)

Palpation

Is the Neck of the Scrotum Free? First palpate the neck of the scrotum i e where it joins the groin If it is not at all thickened then the swelling must be purely scrotal, and hernia the commonest condition of all, is excluded If it is thickened, then the swelling must be regarded as inguino scrotal and includes hernia In view of the prevalence of hernia,

PHYSICAL EXAMINATION LOCAL

INSPECTION

Since the commonest scrotal swelling is a hernia, much of the local examination focuses round the features of hernia, which have been previously considered The size shape and situation of the swelling must be noted and commonly, on inspection alone, one is able to tell whether it is purely scrotal or involves the inguinal region as well A hernia is inguino scrotal

Has it an Impulse on Coughing? If it has, it means there is a communication between the scrotal swelling and the abdomen whether intra or extra peritoneal While we recognize that an expansile impulse on coughing is the most characteristic feature of hernia it may also be present in varicocele, psoas or iliac abscess with a scrotal extension or an hour glass hydrocele In the case of the abscess the whole pathology is extra peritoneal but the upper part is intra abdominal and therefore subject to variations in intra abdominal tension

In the case of the hour glass hydrocele the processus vaginalis is only obliterated at the internal ring the cord and the vaginal part remaining patent If distension with fluid occurs there will be a sac inside the inguinal canal as well as one in the scrotum That in the inguinal canal is subject to pressure from contraction of the belly muscles, and the fluid will therefore be forced out into the scrotum with an expansile impulse Often, too the inguinal sac is large enough to contain all the fluid present and so the scrotal part can be reduced into the inguinal portion The resemblance to hernia is consequently very marked and the diagnosis is often missed

The congenital hydrocele calls for some consideration here It consists in complete patency of the processus vaginalis with a collection of fluid in it There is a communication with the peritoneal cavity and consequently there is a potential hernia The patency of the internal ring means that when there is fluid in the processus there is also fluid in the peritoneal cavity and this is often the source of the fluid Most of the cases of congenital hydrocele are seen in children and the fluid in the abdomen is most frequently due to tuberculous peritonitis In some cases, actual tuberculous deposits may be found at the bottom of the tunica vaginalis

In adult males on the other hand free fluid in the abdomen is in 90 per cent due to carcinoma with peritoneal involvement The special complaint of the patient in these cases is that whatever he does he is no longer able to keep the hernia reduced in other words no truss will prevent the fluid from getting into and distending the sac In some of these patients comparable with the children secondary carcinomatous deposits may be found in the bottom of the sac The patient may

be quite unaware of any carcinomatous development and he seeks medical advice because of the increased difficulty he has with his hernia, which previously was controllable

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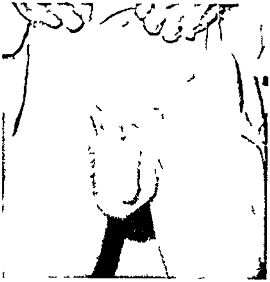
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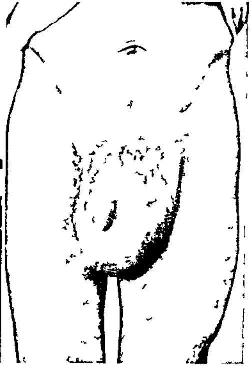
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Fig 102 Haematoma of lower pole of left scrotum

Fig 103 Left undescended testis fibrosed as result of old torsion with large extra parietal sac of inguinal hernia superficial to the external oblique Right testis inverted



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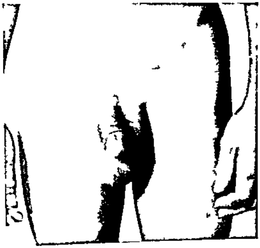
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Fig 104 Small primary hydrocele of tunica vaginalis

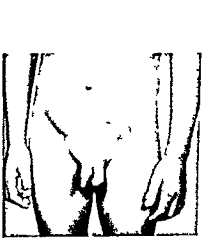
Fig 105 Large primary hydrocele of tunica vaginalis resembling an inguino-scrotal swelling on inspection

Fig 106 Chronic epididymo-orchitis with large secondary hydrocele

Fig 107 Hydrocele of cord Testis free below it



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107



108a



108b



107



110

Fig 108 *a* and *b* Tuberculous epididymitis with sinus below and behind

Fig 109 Specimen—tuberculous epididymitis with large hydrocele and posterior sinus No involvement of body of testis

Fig 110 Specimen—advanced tuberculous epididymitis with involvement of body of testis by continuity Posterior sinus present No hydrocele

Fig 111 Tertiary syphilitic orchitis with large hydrocele

Fig 112 Gumma of testis breaking down anteriorly No hydrocele



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Fig 113 Specimen—Gumma of testis with large hydrocele preventing involvement of scrotal wall and breaking down in front.

Fig 114 Nodular leprosy with involvement of testes and resulting gynaecomastia (case of Dr Michael Gelfand Salisbury)

Fig 115 Simple cyst of epididymis

Fig 116 Specimen—Simple cyst of epididymis with hydrocele of tunica vaginalis



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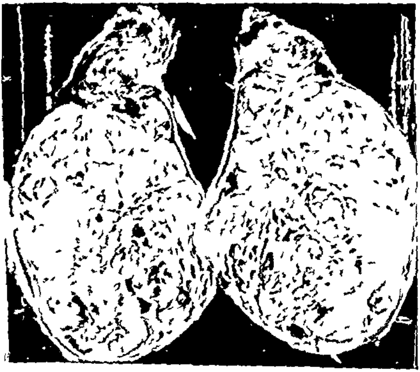
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Fig 117 Specimen—Lipoma of epididymis

Fig 118 Malignant tumour of testis—no hydrocele

Fig 119 Malignant tumour of testis with hydrocele

Fig 120 Malignant tumour of testis with secondary in guinal glands following ir volvement of scrotal wall

Fig 121 Specimen—Teratoma of the testis Low grade malig nancy

Fig 122. Specimens a and b Embryonal carcinoma, w hydrocele Local growth s localised to testis and e capsuled



122a



122b



123

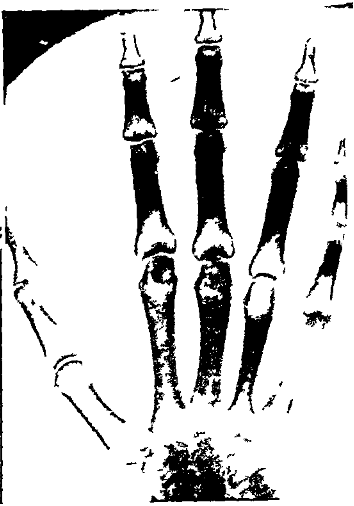
Fig 123 Specimen Embryonal carcinoma, no hydrocele Growth shows considerable infiltration up the cord

Fig 124 X ray photograph of chest showing metastases in a case of seminoma of the testis Note the large size of the secondaries

Fig 125 X ray photograph of the hand showing an osteolytic secondary from a malignant testis previously removed Patient did not associate the conditions



124



125

it is well to examine as for hernia at once if the swelling is inguino scrotal Its presence or absence is readily decided except in cases with complications such as irreducibility No detailed description need be repeated here but individual points will be referred to in dealing with the scrotal condition The consistency, surface, edge and relations of the scrotal swelling must be made out, especially with reference to the testis

The chief point to decide is whether the testis is involved, and if so what part of it In many cases the testis can readily be felt and outlined and so the relationship of any mass to it determined easily On the other hand it may be difficult or even impossible to distinguish the testis by objective palpation In these cases one attempts to elicit testicular painful sensation produced by squeezing the body of the testis, but not the epididymis It is the same sort of sensation as is produced in squeezing the ovary breast or kidney and the patient usually recognises it at once When it is elicited it means that the body of the testis has been located and that there is normal testicular tissue present It is lost where the testicular tissue is destroyed and consequently it may be of considerable value as a diagnostic point

It is lost early in gumma of the testis Here the body is almost invariably involved and frequently diffusely

It is rarely lost in tuberculosis The disease starts in the epididymis and spreads only very late as a rule, by continuity of tissue into the adjacent part of the body The body is almost never totally destroyed

In neoplasms testicular sensation is usually lost late The body of the testis may be destroyed either by pressure or infiltration the simple tumours being limited to pressure for producing it It is likely to be much longer in developing in simple than in malignant tumours

In cases of hydrocele of the tunica vaginalis while one relies on the demonstration of testicular sensation as one method of placing the testis in cases where one cannot define it, the tension of the hydrocele may be so great and the size so large that even testicular sensation may not be obtainable

Consistency The consistency of the swelling naturally varies in acute and chronic inflammatory conditions according to their virulence activity, and stage of development in neoplasms according to the structure and the tissues comprising them their activity or chronicity degeneration etc and in other swellings according to their nature e g hydroceles and varicocele

Fluctuation is important as it usually means fluid of which the common example is some type of hydrocele but it may also be present in the abscesses referred to above coming from the abdomen in which case an important feature is fluctuation from the groin or above it to the scrotum At the same time it may occur in a local abscess or in

an area of haemorrhage or degeneration in a neoplasm If fluctuation is obtained it becomes necessary to find out whether the fluid is translucent or not

If it is translucent it usually indicates clear fluid but exceptions such as the hernias of small children and lipoma of the spermatic cord must be kept in mind Fluids which are not translucent are those which have blood in them even in small amount, e g in injury inflammation or neoplasms and pus or spermatic fluid

In some cases, too where the fluid may be clear a grossly thickened wall and pigmented skin may mask the translucency In the case of hydroceles the translucency test not only gives information of the type of fluid but it will often show up the testis as an opaque area in those cases where neither the patient nor the doctor can feel it This will help to avoid pushing the trocar into the testis instead of into the hydrocele should tapping be considered necessary or advisable

Surface The acute inflammatory swellings are usually diffuse and even and smooth The chronic inflammatory ones vary the tuberculous focus being usually nodular and craggy hard soft or fluctuating and occurring in any part of the epididymis starting as a rule in the globus major or minor The skin is likely to be infiltrated over it i e ordinarily at the back

The syphilitic gumma involves the body and usually produces a diffuse even swelling of it firm throughout and, if involving skin doing so anteriorly

The neoplasms are often smooth and well defined at first the simple ones becoming nodular, the malignant ones infiltrating and losing their defin tion

The varicoceles are usually described as feeling like a bag of worms and it is a very realistic description

Condition of the Cord and the Vas Deferens Thickening of the vas will produce thickening of the cord but it is important to remember that thickening of the cord may occur without the vas being affected at all e g., the presence of a hernial sac will do this the vas being normal

Where we are dealing with scrotal swellings, these may or may not involve the cord or vas and they do so differently In acute inflamma tory swellings of the testis, produced by ascending infection there is always thickening of the vas and its surrounding tissue This is evenly so and throughout its length

In the chronic inflammatory conditions tuberculosis of the epidi dymis tends to extend up along the vas and where it does so it gives rise to a nodular thickening described as beaded In syphilis the involvement of the cord is so uncommon that if there is thickening it is almost certain that the diagnosis is wrong

In the neoplastic conditions the vast majority do not affect the vas

and the cord, but the rapidly growing infiltrating ones may do so by continuity and lymphatic spread The greatest thickening is usually near the testis and as the condition progresses the thickening may be much greater than in any other condition This is perhaps more commonly seen in children

Enlargement of Inguinal or Lumbar Glands It is important always to bear in mind that the lymphatics of the testis drain into para aortic lumbar glands situated therefore and felt mainly above the umbilicus By the time they are felt they are usually very large If the inguinal glands are enlarged then it means that the condition has extended to involve the surrounding scrotal tissues and it is a bad prognostic feature

Rectal Examination This is chiefly done with a view to demonstrating affection of the prostrate and seminal vesicles Their development may ante or post date the testicular condition and this has to be decided as it affects the prognosis and the treatment While the prostrate is readily felt just above the internal sphincter, the seminal vesicles may be very difficult or impossible to palpate, either from the depth of their position or the shortness of the examining finger

PERCUSSION AND AUSCULTATION

These are usually of minor importance percussion determining the possibility of the scrotal swelling being air containing and, therefore, pretty certainly a hernia the auscultation giving information chiefly in relation to excessive vascularity

SPECIAL EXAMINATIONS

(*a*) A complete urological investigation may be necessary in infective conditions acute or chronic, to determine the degree and extent of involvement

(*b*) Tapping may be advocated in the case of fluid collection, especially hydroceles of chronic type whether primary or secondary

The objects of the tapping are

(1) To examine the fluid

(2) To examine the testis

(3) To relieve the weight and discomfort and inconvenience

(4) To cure the hydrocele possibly

The fluid from the average primary hydrocele is clear and straw coloured and does not clot on standing It is a transudate The fluid from a spermatocele is thickish opalescent, and contains spermatozoa

The fluid from other types of epididymis cyst, mostly from vestigial remains (organ of Giraldes or vasa aberrantia) but possibly endothelial lined usually resembles that seen in hydroceles, but is paler as a rule In the case of secondary hydroceles the fluid varies very much It is chiefly exudate but may be partly transudate and haemorrhage

In the acute hydrocele, due to an acute inflammation in the testis or epididymis, the exudate is plasma, and in the most acute cases it may be bloodstained It is usually small in amount and clots on standing Clinically it is often small enough to be missed and it is rarely tapped

In the chronic inflammatory hydroceles commonly in tuberculous and syphilitic affections of the testis the collection of fluid may be large and it usually collects more quickly than in the primary cases Although chiefly in the nature of an exudate it closely resembles the fluid withdrawn from a primary hydrocele It does not clot on standing as a rule

In neoplasms especially malignant a hydrocele may also occur In such cases there is usually blood present as well as the hydrocele fluid The hydrocele may be of considerable size

A so-called hydrocele of the testis is not a hydrocele at all It occurs under the tunica albuginea between it and the testicular substance and is in the nature of a serous cyst the result of injury and haemorrhage It is small, flattish and not usually diagnosed It is not translucent and there is no need as a rule to interfere with it

As has been mentioned in many cases of hydrocele it is impossible to get any information about the testis, on account of the size and tenseness of the swelling Tapping is frequently done in order to examine the testis for pathology and so determine whether the hydrocele is primary or secondary After the removal of the fluid the testis can usually be examined easily in detail both as to the epididymis and the body

The Possibility of Cure

The patient is more likely to be optimistic about this than the surgeon While in children tapping will frequently cure the hydrocele, in adults the usual thing is for the fluid to re accumulate the time taken for it to do so varying from 2 3 weeks to months The operation is, however, so simple that the patient is often more pleased to carry on repeating it than the surgeon

In the secondary hydroceles, recurrence is likely to be more rapid than in the primary ones A point which has been referred to but which bears repetition is that in tapping a hydrocele it is necessary to be certain where the testis is, as the object of the operation is to get the trocar into the cavity and not into the testis

While nothing more than haemorrhage may result from pricking the testis, secondary infection may supervene and destroy the organ and in any case the hydrocele is not relieved If the testis cannot be felt by either the patient or the doctor then the translucency test may show it up The possibility of an inverted testis with the epididymis in front, and the tunica vaginalis therefore behind, is a not uncommon one

desire to micturate In this case the pain, which results from excessive contractions of the plain muscle, leads to the desire to micturate, but it is not the act of micturition which causes the pain This association was explained on a developmental basis It is therefore, most important to keep in mind that whilst one commonly thinks in terms of the act of micturition being the cause of the pain in some cases the pain is the cause of the micturition

When and Where? In describing the pain one refers to it as occurring before, during or after micturition, and where it is felt These are often best taken together

Before Micturition As has been mentioned, pelvic or ureteric irritation, especially if pain is associated will lead to the desire to micturate but the act of micturition has no effect on it The ureteric distribution of pain, which includes renal colic, is that of the genito-femoral nerve, i e , it commences as a rule in the loin, and then comes forward into the groin and the testis, and perhaps down the front and the inner side of the thigh

Where the body of the bladder is responsible, the amount of dis tension that can take place before the act is precipated, depends on the state of irritability of the bladder The more irritable the bladder, the less the distention possible before the reflex is set up The con traction also, in the presence of an added irritant usually infection with inflammation is likely to be more severe than normal and give rise to pain If the part mainly affected is the body of the bladder the discomfort and pain are felt in the hypogastrium above the pubis, whereas if the trigone is also involved the pain is likely also to be felt *in the perineum behind the scrotum*

During Micturition If the bladder is responsible for it it is due to the contractions during micturition keeping up the painful tension, and the distribution is as above, according as it affects the body of the bladder, the trigone or both Prostatic pain resembles very much that due to trigonal mischief

When the pain is due to urethral disturbance usually urethritis there is some modification whether we are dealing with the anterior or the posterior portions or both If the anterior urethra alone is involved, pain is limited to the duration of the act and is felt along the urethra If the posterior urethra is involved in addition, it is apt to be referred to the base of the glans penis and with the final contractions emptying the posterior urethra some of this pain may continue after the cessation of the act Prostatic pain combines that of trigonal and posterior urethral conditions

After Micturition [illegible] occurs in trigonal prostatic and posterior urethral [illegible] as explained in connection with the posterior [illegible] evacuating contractions continuing after

the tract is emptied It is felt in the perineum behind the scrotum and at the base of the glans penis, in the female in the clitoris

In some cases of prostatic mischief especially, the only pain felt may be that at the end of micturition When a calculus is present in the urinary bladder, it lies quite free as a rule, while there is urine present On emptying the bladder, however, the contracting muscle grips the stone and produces spasm with pain at the base of the glans penis chiefly, as in the case of the trigone mentioned above

Mode of Onset This varies with the pathology In inflammatory conditions the tension gradually increases, and so does the pain With the contractions of evacuation it is usually greatly increased In the case of stone the pain is due to marked spastic contraction in an endeavour to pass it, whether it be in the ureter, bladder or urethra The pain therefore, is usually sudden and acute and the distribution depends on the site of the stone

Not infrequently the same applies to a papilloma During micturition a portion of the growth floats into the internal meatus and may block it This may result in a sudden severe spastic contraction to expel what is recognized as a foreign body, similar to what happens with a stone This type of occurrence is not limited to urinary bladders but may occur in any hollow muscular system

Mode of Termination The cessation of pain very often resembles the onset, i e if it starts suddenly it ceases suddenly, and if it starts slowly and gradually it ceases in the same way

In inflammatory conditions, the wall of the viscus as well as the lining is affected Slowly increasing tension produces slowly increasing pain, which may be greatly increased by muscle contraction When the evacuating act is over, the intra vesical tension is relieved and that part of the pain is likewise relieved, *but there remains the intramural* tension, which continues with contraction, distention, or increased exudate In purely mechanical conditions like stone or papilloma sudden obstruction is likely to be produced and an equally sudden excessive contraction to overcome it Hence the sudden onset of great severity Should the obstructing agent be passed, or freed and dropped back into the cavity it came from the relief is immediate and the cessation of pain as sudden as the onset In the absence of inflammation in these cases, there is no hang over and the relief is complete

Is it Aggravated by Exercise or Not? Where we are dealing with a mobile stone as e g in the pelvis of the kidney or the bladder exercise is likely to move it about and cause more irritation from it than if it were lying quietly The result is that mobile stones are more likely to cause attacks of attempted evacuation during exercise than during rest An equivalent of exercise, which is a general body effort, is found locally in the filling of the bladder with urine and its subsequent

desire to micturate In this case the pain, which results from excessive contractions of the plain muscle leads to the desire to micturate, but it is not the act of micturition which causes the pain This association was explained on a developmental basis It is, therefore most important to keep in mind that whilst one commonly thinks in terms of the act of micturition being the cause of the pain, in some cases the pain is the cause of the micturition

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After Micturition This occurs in trigonal prostatic and posterior urethral conditions It is due as explained in connection with the posterior urethra, to the final evacuating contractions continuing after

is infection and inflammation, the frequency is likely to be more marked or more noticeable at night Where chronic obstruction is present, whether due to prostatic disease or stricture of the urethra, the first symptom complained of by the patient is usually increased frequency The reason is simple As a result of the slowly progressive incomplete obstruction, the bladder wall hypertrophies to overcome it, and with this we get a more irritable hypertonic muscle The result is that it requires much less stimulant in the way of increased tension to bring on the desire to micturate With much less urine in the bladder, therefore the patient micturates and frequency is increased accordingly In view of the fact that some increased frequency during the day will incommode the patient very little he usually notices chiefly the increased frequency at night, when he may have to get out of bed three or four times

Frequency may be increased to such a pitch that the patient has a constant desire to void and may be continually trying to do so This condition is called strangury and is most distressing giving the patient no rest It is usually caused by severe trigonal or posterior urethral irritation e g in acute cystitis or a stone permanently engaged in the neck of the bladder It is the equivalent of tenesmus at the anus

STREAM

The size and force of the stream are the two chief points on which we wish information from the patient, and a great deal can be obtained that is of value in assessing the condition

If a patient has such marked frequency that he has to micturate every half hour there is so little urine with each act that there is neither size nor force registrable in fact, the patient does little more than dribble Where obstruction develops gradually and progressively as in prostatic disease and stricture of the urethra hypertrophy of the bladder muscle occurs to overcome it This has already been mentioned in relation to frequency

From the point of view of the stream the results are different The prostrate surrounds the neck of the bladder and is practically covered by the muscle fibres there In straining there is the tendency to compress the prostrate and so close the already obstructed passage the result being that the only likelihood of his micturating comfortably is if he does not strain Consequently the stream has no force, but its size may be normal If he strains he stops it The force is often so much impaired that he has great difficulty in clearing his boots and he has to lean well forward to do so

In the case of stricture of the urethra there is no block at the bladder neck and the patient strains to hasten the completion of evacuation as the stream is diminished in size according to the tightness of the

evacuation The stream of outflowing urine is apt to carry the stone with it to the bladder neck and it may then lead to the obstruction that precipitates an attack If the stone is too big to become engaged in the internal meatus it is all the more likely to be easily freed and dropped back into the bladder with sudden relief

This is completely opposed to what takes place in purely inflammatory conditions Exercise has no effect on them and they are frequently worse at night when the patient is resting e g cystitis which is much more likely to cause trouble at night than during the day A patient with stone alone usually has complete relief at night Naturally if both a stone and inflammation are present the patient s story will include both types of symptoms i e, both night and lay trouble aggravated by exercise

Frequency

Frequency to be a symptom must be increased and so become a nuisance The average individual voids about 6 times in 24 hours Many go longer without discomfort and therefore, to gauge the situation properly one must know what the patient s normal frequency is

Increased frequency may be due to several different causes (1) Irritation or pain outside the lower urinary tract (2) Irritation and inflammation in the lower urinary tract (3) Chronic obstruction of the lower urinary tract

Irritation or pain outside the lower urinary tract is seen in two quite different conditions In the renal pelvis and the ureter inflammation or a stone may give increased frequency with or without pain as a factor The stone as a rule produces the frequency with the attacks of colic but in pyelitis whether acute or chronic (tuberculosis) increased frequency of micturition is often complained of, though there is no pain In a pelvic appendix with commencing peritonitis, the irritation of the back of the bladder may lead to increased desire and frequency, then hesitancy and finally complete retention In the case of inflammation outside the ureter increased frequency is a common complaint In the case of the ureter the act of micturition has no effect on the pain or irritability but in the pelvic peritonitis the act of micturition is likely to produce pain

Irritation and inflammation in the lower urinary tract is the commonest cause of increased frequency e g infection and stone separately or together Where abnormal irritation is present the sensitivity is increased and distention of much lesser degree than normal may bring about the desire to micturate and so produce increased frequency There may be no pain depending on the acuteness of the condition present Where it is a mechanical irritant like a stone the increased frequency is found during the day and with exercise but where there

In young men	gonorrhoea with a prostatic abscess
In middle aged men	stricture of the urethra
In old men	prostatic disease
In young women	backward displacement of the pregnant uterus
In older women	uterine fibroids

URINE

Apart from the laboratory examination of the urine which gives detailed and scientifically correct information much of clinical value can be obtained from the patient s story and observations

The *amount* of urine passed varies considerably within normal limits Usually those who perspire freely drink freely to compensate Heavy perspiration renders the urine less in amount and more concentrated In cold weather with no perspiration the quantity of urine passed is increased Unless the quantity is very great or very small the patient is unlikely to make any note of it In both cases the condition is more likely to be medical than surgical though the amount may be considerably increased in any chronic obstructive lesion with progressive kidney damage and very markedly diminished or even suppressed in late stone obstruction especially if it is bilateral

The *specific gravity*, which is the most important single test of urine can be gauged by the patient s description of his urine If it is highly coloured, and especially if pinkish urates subsequently separate out, the specific gravity is likely to be at least 1015 and such an observation negatives the possibility of high blood urea or uraemia from renal incompetence Where on the other hand it is large in quantity and very pale in colour as in the late stages of prostatic obstruction renal in competence is strongly suggested, more especially if he notices no difference in his day and night urine Normally a patient will void before going to bed and will then carry on through the night without drinking or micturating. In the morning the urine is always more concentrated in these circumstances than that passed whilst he is constantly drinking during the day

Urine is usually clear on being passed its *colour* depending on its specific gravity and concentration It may become cloudy as it cools This suggests urates which vary in colour from whitish or palish pink to deepish red If the urine is cloudy when it is passed it suggests phosphates or oxalates or pus Both phosphates and oxalates tend to be passed in main concentration at the end of micturition and oxalate crystals particularly are likely to irrigate the trigone Pus on the other hand according to its amount may produce a cloudy urine or even a thickish creamy one where the quantity is large If it is present in the first urine it suggests a urethral origin If it comes with the last urine it suggests a prostatic origin If it is diffused throughout the

stricture With the straining and aided by the hypertrophy the force is greatly increased, so that the stream can be projected much further than normally This compares with the increased distance obtained in a garden hose on shutting down the outlet In both, as already described, increased frequency at night is the first complaint as a rule this being due to the hypertrophy of the bladder muscle which is a compensatory mechanism

When compensation fails, dilatation commences and is progressive behind the obstruction, a certain amount of urine failing to be evacuated with the act This is known as residual, and its quantity is the measure of the dilatation and so of the degree of incompetence of the bladder In the case of the prostrate the residual urine is retained in the bladder, but in the case of stricture, which is usually found in the bulbous part, the first dilatation takes place in the posterior part of the urethra The result is that when the bladder is emptied, there is still urine in this dilated part of the urethra, and he has to stand and wait while that dribbles away, otherwise he will soil his clothing The force automatically begins to fail in the stricture case, when dilatation commences

Interruptions of the Stream As has been mentioned, this is likely to occur with stone or papilloma, when either, during micturition may temporarily block the internal meatus As it gets free again micturition recommences and this may repeat itself Middle lobe enlargement of the prostrate may have a similar effect, a ball valve effect being produced

Retention of Urine In the cases of slow progressive obstruction discussed above, retention may be the final result of the failure of compensation and the occurrence of residual is the fore runner of retention which simply means further obstruction and complete in competence to deal with it In acute inflammatory conditions this can occur very rapidly e g in acute prostatis especially with abscess formation

Especially in ordinary prostatic obstruction, when the patient gets complete obstruction the bladder may reach the umbilicus and fre quently with this there is an overflow of urine so that it continually dribbles away—it saves the patient from rupture of the bladder In such cases the patient will usually come complaining that he cannot hold his water and is greatly surprised to find that he has obstruction with retention

In the case of stricture if complete retention intervenes the patient is particularly likely to rupture the urethra behind the stricture and be brought to hospital with urinary extravasation

Rutherford Morison in his aphorisms used to give as the most common causes of retention

In the child — impacted urethral calculus and a string round the penis



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Fig 126 X ray photograph of staghorn calculus in kidney

Fig 127 Specimen Staghorn calculus *in situ* Small degree of hydronephrosis

Fig 128 *a* and *b* X ray photograph of a large phosphatic stone *freely movable* in a big hydronephrotic kidney

Fig 129 Specimens Oxalate calculi the one on the left pure oxalate those on the right with superadded phosphate following infection



128a

128b



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urine it suggests a renal origin From the bladder it is apt to be present *in great quantity with thick ropy mucus throughout but may be more* concentrated with the last urine It is important to remember that pus in the urine in females may not come from the urinary tract at all

The *presence of blood* is extremely important, but it is well worth remembering that a patient will often think he is passing blood, when it is only highly coloured urine with urates Small quantities of blood produce a smoky urine, while large quantities make the urine bright red frequently with clots in addition If clots come from the kidney they are usually long and worm like while from the bladder this is not so the clots being more massive and conglomerate Blood from the kidney is likely to be diffused throughout the urine

From the bladder there is blood throughout the urine but there is usually concentration of it in the first and last urine, with a clearer portion between

In the case of papilloma or stone there may be no bleeding at all till either is gripped and squeezed at the end of the act when pure blood may appear

In the papilloma the bleeding is liable to be profuse and painless while in the stone it is usually small in quantity and painful The bleeding from the papilloma is apt to be repeated at fairly long inter vals from the stone more frequently, if the haemorrhage is a symptom at all Prostatic bleeding is similar though there may have been *considerable bleeding into the bladder before micturition In any case* it is usually most with the last urine In urethral bleeding the blood appears with the first urine, but if it is present in any quantity it escapes independently of micturition as well

Gravel or Stones This description is simply a question of size Gravel which usually consists of tiny stones is more readily passed than the larger conglomeration of crystals A considerably larger stone may be passed through the urethra in the female because of its larger size than in the male In the male a stone the size of a small pea may pass but it depends on the size of the different parts of the urethra which vary greatly in different individuals The external meatus is usually a guide as to possibilities as it is the narrowest part

The typical story of the passage of a small stone is that while *micturition is in progress the stream is suddenly interrupted* and then with a feeling of greatly increased pressure it suddenly starts again and with this he hears a bang as the stone hits the receptacle, if he is using one Such patients may give an old history of renal colic

Hair in the urine is a rarity but when it occurs it means the rupture of an ovarian dermoid into the bladder

Faeces and gas in the urine indicate the presence of a faecal fistula and may occur in either sex

Foetor of the urine suggests a faecal contamination or a sloughing or gangrenous bladder mucosa Many urines have an unpleasant smell particularly ammoniacal, due to infection and decomposition but these are not foetid (Figs 126 144)

PREVIOUS HISTORY

Where a condition is chronic a previous history of an acute onset may be given e g a gonococcal infection In the late stages of obstruction the earlier story may be obtained In the case of bleeding earlier similar attacks may have occurred Small stones or gravel may have been passed previously

PHYSICAL EXAMINATION GENERAL

Apart from general evidences of inflammatory fever, anaemia, cachexia and emaciation which would attend similar pathological processes elsewhere the most important special general condition which is likely to develop in these cases is chronic uraemia arising from a gradual progressive destruction of renal tissue chiefly due to obstruction and back pressure though often much aggravated by infection

The urine is large in quantity of very low specific gravity viz 1002 or so The facies though somewhat difficult to describe is fairly characteristic to those of experience The complexion is usually sallow, including a certain degree of pallor a suggestion of anaemia and a slightly yellowish tint insufficient to be described as jaundice and the patient looks ill and often dull The skin is dry He is frequently restless and apt to get out of control and become obstreperous He complains of marked and persistent thirst more or less continuous and often severe headache frequently occipital, and he has probably lost a good deal of weight

PHYSICAL EXAMINATION LOCAL

Inspection Palpation and Percussion

Abdomen Kidney Ureter and Bladder In the normal individual nothing can be seen or felt although an abnormally mobile kidney may be palpated Apart from this if a kidney can be seen or felt it is likely to be pathological It usually comes down lateral to the colon as it enlarges tending to push it medially and downwards It may then be seen in the loin coming down under the costal margin It moves with respiration but only as a rule at the end of inspiration On palpation it fills the loin and can be felt bimanually The outline may remain kidney shaped and the respiratory movement can be verified It is the rarest thing for a renal swelling to cross the middle line The colon can be percussed lying medially to the main part of the swelling,



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143



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Fig 140 X ray photograph Pyelogram of right kidney showing filling defect due to carcinoma
Fig 141 Specimen Hyper nephroma involving the hilar part of the kidney and giving the appearance of encapsula tion
Fig 142 X ray photograph Cystogram showing the pre sence of sacculi
Fig 143 X ray photograph Cystogram showing filling de fect due to carcinoma
Fig 144 X ray photograph showing osteoblastic meta *stases in spine and pelvis* secondary to a carcinoma of the prostrate of low malig nancy

SCHEME XII

CALCULI IN GENERAL SPECIAL FEATURES

While gall stones are perhaps the commonest calculi the student sees there are many others including urinary salivary pancreatic, prostatic etc and they all conform to type in the clinical manifestations

HISTORY PRESENT ATTACK

What is known as an attack when applied to calculi means the clinical evidence of an attempt to get rid of the stones Such an attack follows the recognition of the presence of the stone which may have been lying quite silently and inoffensively without giving either the patient or the viscus particularly affected any indication of its being there

The two chief causes of attacks are the mobility of the stone and the occurrence of infection and inflammation in the hollow muscular system in which it is present When the stone is mobile it may cause more irritation to the mucous membrane or it may get displaced so that it blocks the lumen of the viscus on the other hand the addition of infection with inflammation renders the mucous membrane more sensitive especially to the presence of foreign bodies (The only hollow muscular system which is not lined by mucous membrane is the vascular system which has an endothelial lining and those with mucous linings are considered in order to simplify matters) As a result it is easy to understand that a small stone is much more likely to give attacks than a big one a staghorn calculus in the kidney pelvis can scarcely move at all and the patient presents himself entirely because of the symptoms of infection

PAIN

This is the most prominent symptom

Onset The onset of the pain may be sudden or gradual If it is sudden, no warning is given and a purely mechanical condition is suggested i e the sudden blocking of the lumen of the viscus by the stone

If it is gradual then warning is given for some time before the really severe pain develops and this indicates that the primary condition is not mechanical but is inflammatory and due therefore, to infection with inflammation

Severity The pain produced by the expulsive contractions of the hollow muscular systems is severe and tends to be maximal In females

the night urine is more concentrated than that of the day whereas when a kidney is incapable of concentration, it is the same day and night as a rule As compared with medical urines, the surgical ones are not usually expected to show evidence of nephritis

The urea concentration test of renal function is a good one but the same information can be obtained simply by taking the patient off fluids for twenty hours and then examining the urine With the lack of fluid a healthy kidney will excrete its quota of urea but in much less quantity of fluid and hence concentration is greatly increased In an incompetent kidney no increased concentration can be obtained In such cases too we know that the blood urea is raised, and such a simple observation may avoid the necessity of blood examination It is especially useful where facilities for carrying out the more elaborate tests are not to hand

Excretion of dyes is also often employed as a test of renal function The amount and the rate of excretion by each kidney can be determined

Special examination of each kidney can be carried out on similar lines but arrangements e g ureteric catheterisation have to be made to separate the urines from the two kidneys



145 Straight X ray photo-
ıph Radio-opaque gall
ınes seen mixed stones
ually associated with chole-
titis



Fig 146 Cholecystogram Non opaque stones seen as filling defects in dye-filled gall bladder Gall bladder function good



Fig 147 Specimens of different sized gall stones giving different types of attacks (see text)



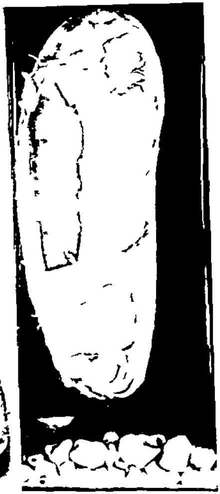




Fig 148 Specimen Large facetted stone giving no symptoms until it caused acute intestinal obstruction

Fig 149 Specimen Gall bladder showing hydrops from impaction of smallish stone in the beginning of the cystic duct. Numerous mixed facetted stones present with old chronic cholecystitis

Fig 150 Specimen Two stones from the same patient. Large dumb-bell stone with large part in common duct and smaller part in duodenum had never given any evidence of its presence the small stone produced complete obstruction of the cystic duct and acute cholecystitis

inflammation occur when these are responsible for any symptoms that arise

Collapse Shivering Vomiting, etc In many cases of stone attacks, the pain is so severe and extreme that the patient is markedly shocked and collapsed with a rigor frequently and profuse sweating In such an event he is sure to remember it Associated symptoms and signs, special to the viscus affected may also be noted by the patient e g blood in the urine jaundice, intestinal obstruction etc The variation in these manifestations is great in different individuals either because the pain produced in a particular case is less marked or the patient is able to stand it better

Swelling Noticed during the Attack When a stone blocks a hollow muscular system as has been described the attempts at evacuation produce extremely severe pain but the blockage will produce distension behind it the size of the swelling depending chiefly on the capacity of the viscus to dilate The patient may or may not notice such a swelling depending essentially on whether it is in such a situation as to be obvious, e g in gall stone attacks except in the thinnest patients, and these are the exception the swelling of the gall bladder is definitely not noticed by the patient The same applies to a kidney On the other hand, in a submaxillary salivary calculus, the swelling of the blocked submaxillary gland is so obvious that it is the rule for the patient to report it

HISTORY PREVIOUS ATTACKS

Frequency There are two conditions which are likely to produce frequently repeated attacks

(1) The presence of infection and inflammation in addition to the stone the resulting increased sensitivity and irritability of the viscus leading to a greater likelihood of its resenting the presence of the foreign body This is probably responsible for the steadily diminishing interval between attacks in the average gall stone case

(2) Incomplete disimpaction of a stone This is most commonly seen in cases where the stone is present in a tube e g the cystic or the common duct or the ureter It is also seen well in the neck of the gall bladder where the conformity of Hartmann s pouch or the commencement of the cystic duct may prevent its falling back free into the gall bladder This is such a well recognized event that in gall stone attacks without jaundice occurring every week or twice a week, the diagnosis is certain to be a stone in the cystic duct or the neck of the gall bladder

Relative Severity and Duration The longer and more severe the attack has been the greater the likelihood of a long impaction having been present and also the greater the difficulty experienced in disimpaction In these circumstances the probability of future attacks is greatly

increased If, in addition, evidences of inflammation were present, the likelihood of subsequent attacks is still further increased

Condition between attacks This is a clinical point which usually helps to decide whether infection and inflammation were present in addition to the stones

Where the attacks have been of a purely mechanical nature, the relief is sudden and complete, and the patient is free of symptoms till the next sudden attack without warning Where inflammation is present also, the relief from the cessation of the attack is neither sudden nor complete, and, as a rule, between the attacks the patient still suffers from the symptoms of the infection and inflammation With the onset of a subsequent attack, there is usually first a reactivation of the inflammation which gives the warning that the more severe attack may be expected (Figs 145 154)

PHYSICAL EXAMINATION GENERAL

Both from a general and local point of view, it is necessary to appreciate the patient s condition between attacks as well as during an attack as, very frequently, the patient consults the doctor after the attack has passed over, and consequently he does not see the patient in an attack at all

During the attack two features are likely to call attention, viz,

(*a*) the possible shock and collapse from the severe character of the pain, varying in different cases very markedly, and

(*b*) evidences of inflammatory fever, in those cases where infection is present as well as the stone In the case of gall stones, jaundice may be observed in certain cases and should be noted In other stones there is nothing of note special to them in the general examination

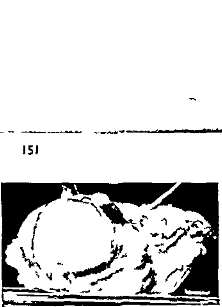
Between the Attacks Here two different pictures are presented, according to whether infection and inflammation accompany the stone or not

(*a*) Where there is no infection and inflammation, and complete relief has occurred from the attacks the patient feels perfectly normal between the attacks and has no complaint In cases where disimpaction of the stone has not taken place, some varying degree of local symptoms may remain between the attacks, but the general condition of the patient is not interfered with

(*b*) Where infection and inflammation accompany the stone, the acute exacerbation which occurred with the attack usually settles down with the relief of the obstruction, but the inflammation remains in a more or less subacute or chronic form With this there is frequently between attacks a condition of impaired



151



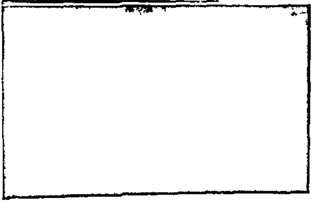
152

Fig 151 X ray photograph Pancreatic calculi (almost wholly calcium salts) involving the whole pancreas (Dr Sennett s case)

Fig 152 Specimen Large submaxillary salivary calculus with the gland No obstructive attacks but trouble from persistent infection

Fig 153 X ray photograph Small submaxillary salivary calculus in Wharton s duct Repeated attacks of obstruction

Fig 154 X ray photograph Large submaxillary salivary calculus unable to get into the duct Symptoms due to associated infection of the gland



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particularly seen in the case of the gall bladder, which is the viscus most commonly affected, as it regularly becomes wrapped up in adherent omentum

Between Attacks

(1) Where the attack has been completely relieved and in the absence of infection and inflammation, no physical signs will be present i e neither tenderness nor swelling and in such cases the diagnosis must be made clinically from the history alone It is a very common event even in gall stone cases, and it emphasizes the importance of a carefully-taken history

(2) Where infection and inflammation accompany the stone, the attack may be completely relieved so far as mechanical blocking is concerned but the inflammation though improved remains In such a case there is no swelling as the obstruction is gone but some degree of persistent tenderness is likely to remain over the organ chiefly from the intra mural tension of the inflammation

A point of clinical and pathological interest arises in these cases viz., that where infection and a foreign body are present together each is likely to aggravate the other e g, the foreign body very effectually prevents the infection from being cured and therefore, the inflammation persists and on the other hand, the presence of the inflammation leads to the foreign body being resented more and so it is likely to produce more symptoms

(3) Where disimpaction has not occurred permanent blocking remains and therefore, the swelling persists In such cases it is found that the musculature of the viscus tires after a time and the severe contractions gradually ease off until they cease altogether The pain abates and the tension is relieved Under these circumstances a certain amount of the fluid content may be absorbed Clinically inflammation is likely to be minimal or absent otherwise the condition would much more likely have gone on to tension gangrene and rupture of the viscus Here we find that there is probably no sign of inflammation and the swelling is well defined and free from surrounding pathology In addition it will probably be very slightly tender if at all as the tension is no longer marked

As stones do not ordinarily give rise to a permanent complete block of a hollow muscular system it is interesting to see how it may occur There are two reasons for it

(*a*) The mucous membrane may ulcerate from pressure at the site of the stone and the fibrous tissue resulting in its healing may grip it *There is no muscle tissue to dilate and permit of the passage of blocked contents but in some cases the presence of the stone may lead to the softening of the fibrous tissue and its relaxation sufficient to let the contents pass even though with difficulty*

health, the patient feeling below par, and presenting symptoms of varying degree, corresponding to the viscus involved

PHYSICAL EXAMINATION LOCAL

Inspection palpation and percussion are carried out according to routine

DURING THE ATTACK

Tenderness As the result of increased tension behind the block, tenderness is present over the affected viscus Pressure increases the tension and so aggravates the pain which is necessarily referred in the same distribution as that already present, and typical of the viscus affected This tenderness is present and can be elicited even when the distended viscus behind the block cannot be palpated It is therefore of the greatest importance in such cases as focussing the lesion It is felt whether inflammation accompanies the obstruction or not

Where the pain is felt at the site of tenderness instead of being referred it means almost certainly that inflammation is present as well as obstruction and that it has extended through the wall of the viscus to the surrounding structures in the abdomen especially to the parietal peritoneum

In the late stages of an unrelieved attack, in the absence of inflammation transudate outside the wall of the viscus may act as an irritant and produce local pain but in such cases the vascular supply of the viscus is so much interfered with that gangrene is threatened and even if infection does not then occur the damaged viscus may itself constitute a source of irritation from the chemical changes taking place in its tissue

Swelling The swelling automatically takes place behind the obstruction and whether it is seen and felt or not it is certainly present When it is situated on the surface e g the submaxillary salivary gland it is usually obvious to the patient and therefore should be even more so to the surgeon A distended gall bladder is more likely to be felt than a kidney with distended pelvis though neither is likely to be seen

A point of importance in such cases is that the tenderness associated with the increased intra visceral tension may be so marked that the patient develops a voluntary protective rigidity over it which may completely mask it unless his attention can be distracted during the palpation which must be carried out with the utmost gentleness

So long as the pathology remains inside the viscus its outline remains well defined but should inflammation extend through its wall to surrounding structures involuntary rigidity may mask it more completely but if it can be felt its well defined outline is liable to be lost This is

SCHEME VIII

SWELLINGS OF THE BREAST

SPECIAL FEATURES

HISTORY PRESENT CONDITION

Duration Generally speaking the longer the duration the less the likelihood of malignancy but the converse does not hold good, as all the acute and sub acute inflammatory conditions come into this category At the same time we may get a very long history (*a*) in those cases where a primary simple tumour later becomes malignant, and (*b*) in the exceptionally slowly growing malignant tumours, e g , one has seen a patient present herself with an atrophic scirrhous carcinoma, of seventeen years standing As opposed to this one must remember that the cystadenomata may grow surprisingly quickly and still remain simple

In the case of the acute inflammatory swellings, the necessarily short history is usually accompanied by an acute illness, very often while the patient is still under the care of the obstetrician

How was the Swelling Discovered? There are usually three possibilities —by chance pain, or discharge from the nipple Discovery by chance or pain covers by far the majority of breast swellings, and of these, that by chance is apt to carry the much more serious significance Malignant tumours are not usually painful till late in their development, and consently the absence of pain is a strong point in favour of the possibility of malignancy, though simple tumours and many of the chronic inflammatory swellings also are painless

The *chance* finding of a swelling which commonly comes about by palpation e g in bathing and not by inspection is much less likely in a big breast than a small one, and should it be malignant it is likely to be much more advanced locally, in the large breast thickly covered with fat As an offset to this in the small breast there is much less intervening tissue to traverse before dissemination occurs

Pain carries with it the suggestion of injury inflammation or duct obstruction as a cause and its occurrence is just as strongly against the likelihood of carcinoma as its absence is in favour of it Should pain draw attention to a carcinoma it is likely to be either very advanced or it is a rapidly growing one, i e encephaloid in type

(*b*) In the case of the gall bladder there is a special mechanism in the arrangement of the spiral valves of the cystic duct If the stone is able to pass the first spiral valve, its mucous membrane may be applied flat on the surface of the stone The greater the tension in the gall bladder behind the stone, the tighter the fold of mucous membrane will be applied and hence the more certain the obstruction a sort of flap valve being produced The swelling may be so large and is so persistent that many of the patients are aware of it for years There is no pain all muscle has disappeared from the gall bladder wall and unless infection supervenes nothing more happens In some gall bladders the formation of Hartmann s pouch resembles the first turn of the cystic duct and this may account for some of the big stones getting permanently impacted there

SPECIAL EXAMINATION

These will depend on the particular region and viscus involved

Radiography is commonly used to show stones, either direct or aided by radio opaque substances etc

Endoscopic investigation may be carried out in suitable cases e g, the urinary tract

condition referred to under this title being the involutionary changes occurring in all breasts particularly as the menopause is approached and function will no longer be required In hypothetically perfect involution no pathology should result but unfortunately, the fibrosis and epithelial atrophy often do not take place simultaneously in equal degree, and frequently ducts are blocked and cysts result from continued activity of the lining epithelium, which may or may not be proliferated In these cases menstruation is usually accompanied by increased secretion and the swellings increase in size frequently with pain, and following the cessation of the menses the size will again diminish. This is an important observation as this fluctuation in size does not occur in neoplasms whose functional capacity is not influenced by the periods

Pain Pain may ante- or post-date the discovery of the swelling. As has been mentioned if it ante-date the discovery of the swelling and call attention to it, it is strongly against neoplastic formations and in favour of inflammatory or obstructive conditions especially the more acute inflammatory ones Exceptions have been referred to

Should it post-date the finding of the swelling, it is a much less important point against malignant disease A large proportion of women who know they have a lump in the breast will develop the sensation of pain in it from worry and anxiety, manipulation etc and this will occur in any lump whatever its nature The observation therefore is of little clinical value

The relation of pain to menstruation again especially if it ante-dates the discovery of the swellings, may be of considerable importance, since it strongly suggests duct obstruction, as has been referred to in connection with the involution of the gland Post-dating the swelling much of its value is lost.

Discharge from the Nipple Most women have no discharge from the nipple except during lactation and for a short time afterwards At the same time from any breast that has lactated one may be able to express a little watery opalescent discharge

On the other hand in the absence of a history of lactation the appearance of a discharge from the nipple suggests something irritating the secretory lining of the ducts or the breast acini and is in favour of pathology The discharge may be watery milky bloodstained or purulent

A most important point to get information on is whether on manipulation discharge may be obtained no matter where the breast is squeezed or whether it only appears when pressure is applied to some strictly localised and limited area When it appears from any and all parts of the breast *it may be due to (1)* lactation when it is milk (2) post lactation delayed involution when it is watery or thin milky fluid (3) infection and inflammation usually subacute or chronic when it may be

Discharge from the nipple in a small proportion of cases may call attention to a swelling, especially if it occurs in a breast that has never lactated and particularly if it is bloodstained

Injury With great regularity, whenever there is anything wrong with a breast, the patient will give a story of injury and in most cases it has nothing to do with the condition present The type of injury whether major or minor, and its time relation to the discovery of the swelling are important A gross injury is likely to be followed by considerable haemorrhage and pain and a haematoma is likely to result with skin discoloration A lump may remain from that time and is most likely to be a serous cyst which is a collection of serum surrounded by walls formed from the organization of the blood clot Should the injury whether great or small, antedate the swelling by many years, one can usually discount it altogether

A single injury may be followed by a malignant tumour which is likely to be a sarcoma and this occurs in mice Carcinoma on the other hand follows chronic irritation which is not so readily registered by the patient

Rate of Growth or Fluctuations in Size The average neoplasm persistently grows The more cellular and active it is the more rapid the growth will be Simple tumours usually grow very slowly, with the exception of the cystadenoma which may be quite rapid The malignant growths are commonly much more rapid than the simple ones and they also vary between wide limits according to their cellular or fibrous nature Progressive inflammatory swellings also increase steadily in size the more acute the inflammation the more rapid the progress

Fluctuations in size may take place for a variety of reasons A haematoma develops very rapidly and if no infection occurs it will then progressively diminish and in most cases will disappear A serous cyst may however remain

In inflammatory conditions which are clearing up the swelling tends to diminish and may also disappear but residual thickening may remain because of fibrous tissue formation Recrudescence is very prone to occur and with it there is an increase or recurrence of the swelling which is likely later again to diminish

In neoplasms especially the more actively growing ones haemorrhage with or without degeneration is liable to occur into their substance This is followed at once by increase in size often with pain to be succeeded by a diminution of the size as some of the blood is absorbed but in these cases the final swelling is usually larger than it was before the haemorrhage took place

Another prominent cause of fluctuation in size of breast *swellings* is menstruation One of the commonest swellings seen in the breast is the fibrous thickening or cyst formation of chronic mastitis the

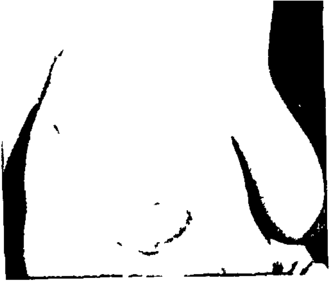


Fig 155 Acute localised ab scess of brea t. Note accessory axillary mamma

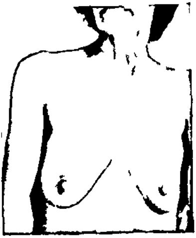


Fig 156 Large chronic ab scess of breast

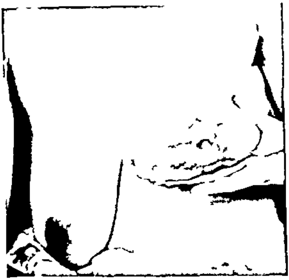


Fig 157 Tuberculosis of the breast. Note the chronic abscess with sinuses both on medial and lateral sides No retraction of the nipple and no fixation of the breast The patient had lung tubercle

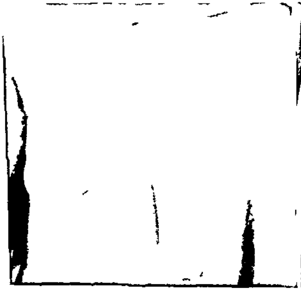


Fig 158 Simple cyst due to duct obstruction

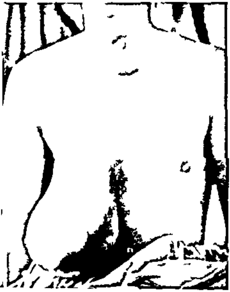


Fig 159 Large fibro adenoma of the breast resembling uni lateral hypertrophy

thickish or thinnish purulent material, or (4) chronic interstitial mastitis of the senile involutionary type, especially if associated with proliferative epithelial changes, when it may be thin and watery or bloodstained, and either brownish or reddish

When it comes from a strictly localised area of the breast it strongly suggests a local pathological cause, and is likely to be either a simple or malignant papillomatous growth, commonly with an associated cyst In such cases the patient may or may not be able to feel a swelling at the site from which the discharge comes, in the simple cases softish, in the malignant ones hard

Two important clinical considerations arise in relation to discharge from the nipple Where it comes from any part of the breast even if bloodstained in a large proportion of cases there is nothing requiring surgical interference indeed any interference at all, whereas if it comes from a definitely localised spot, surgical interference is definitely indicated, whether a swelling is felt or not though this may be simply exploratory

Skin Eczema This may or may not be of importance surgically, and it is only likely to be so in those cases where it is limited to the nipple area and unilateral Bilateral extensive eczema of the breasts and especially the intertrigo type in the thoraco mammary folds are usually of dermatological interest only

When it is limited to one nipple area it may be serious, as this is how Paget s disease which is precancerous commences and goes on to the development of carcinoma either a superficial epithelioma or a deeper scirrhous cancer or both

Variations in the Size of the Breast This is particularly likely to be seen in diffuse chronic interstitial mastitis in the younger women with menstruation and it is often associated with multiple swellings in different parts of one or both breasts with considerable activity It is *more or less an exaggeration of the congestion and fullness of* the breasts at the menstrual periods, which occurs normally at the periods but which varies widely in different individuals Between the periods the swelling diminishes

In the case of infection and inflammation especially of the acute type the whole breast may be involved and the swelling therefore diffuse and increasing during the progressive stage of the condition including the occurrence of suppuration but as the inflammation settles down the swelling will become less

The behaviour of the breast as a whole in the presence of neoplasms, may vary considerably In the simple tumours with few exceptions the only one to resemble a diffuse enlargement of the breast and often to be indistinguishable from it as the gland tissue cannot be identified separately is the cystadenoma In this tumour there is a relatively rapid





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Fig 160 Large peri canalicular fibro adenoma (in a girl aged 19 years) Smooth outline

Fig 161 Large intra canalicu lar fibro adenoma Note marked nodularity and projection

Fig 162 Cyst adenoma of breast Note gross lobulation

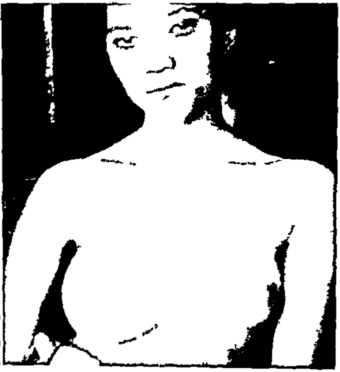
Fig 163 Sarcoma of breast—swelling well defined

Fig 164 Encephaloid carci noma of the left breast Wide extension

Fig 165 Scirrhous carcinoma of the breast—marked con traction



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progressive enlargement Occasionally a very large fibro adenoma or a sarcoma may present a similar appearance

In the atrophic scirrhous carcinoma, which may last from 10-25 years, the patient may be quite unaware of any tumour and only note the steadily progressive shrinkage of the breast, frequently with displacement, especially towards the axilla

In the ordinary scirrhous carcinoma, the patient is aware of a lump, usually a flattish one, and the breast is often noticed to appear to become progressively less than the opposite healthy one, at all events for a considerable time In the case of encephaloid carcinoma, the increase in the size of the breast may be so rapid and diffuse, from the extensive infiltration that the question of a neoplasm is not entertained either by the patient or her doctor the condition being regarded as an acute inflammatory one

In cases of haemorrhage into a soft active growth it is much more likely to give rise to a localised increase in size rather than one apparently involving the whole breast In the encephaloid carcinomas, especially when haemorrhage occurs, pain is usually present (Figs 155 166)

PREVIOUS HISTORY

The Breast Itself Previous disturbances in the breasts may have an important bearing on present pathology There may have been secretory disturbances at puberty but these usually settle down completely Inflammatory conditions may have been present and especially if abscess formation occurred ducts may be blocked either by cutting or car formation and gross pathological changes may occur in the affected part

The occurrence of previous lumps in the breast is often of significance Previous cysts may indicate that the present swellings are the same and fibro adenomata also especially the intra canalicular variety are frequently multiple and in both breasts, others appearing after the local removal of previous ones Their previous presence may also suggest the possiblity of carcinoma as they are particularly prone to become malignant

Pregnancies Pregnancies carry with them lactation and the gross proliferative and secretory changes accompanying it followed by equally gross involutionary changes In other words there are gross structural and functional changes in many patients repeated several times Irregularities may easily occur so that these changes are not carried out to perfection

The question too whether the babies were breast or bottle fed is an important one If the baby be bottle fed it means that all these gross changes have taken place and the secretions have only been imperfectly removed in the absence of suckling The retention of secretion often

has no effect in this way Displacement of the breast, which varies very much in its degree, is most commonly seen during the development of a carcinoma, but also follows the more serious cases of infection and inflammation, especially where gross destruction has resulted

In carcinoma the displacement depends upon the spread of the growth and the subsequent fibrosis, which takes place in the ordinary scirrhous type The extension which affects the position of the breast as a whole is lymphatic and the two chief avenues of spread are, firstly, the drainage along the ducts to the sub-areolar plexus and, secondly, the main lymph drainage from there to the axilla Where the primary growth is in the upper and outer quadrant, fibrosis between it and the sub areolar region will foreshorten the distance between them and tend to lift the breast though it especially results in retraction of the nipple The main drainage from the nipple area to the axilla with subsequent fibrosis, tends to pull the breast towards the axilla and so lift it above the normal level This is the common displacement seen Should the primary growth be situated elsewhere this displacement will be modified to correspond

Besides this lymphatic spread, extension by continuity of tissue in the breast substance will have some, though usually very little, displacing effect To gauge the amount of displacement, it is customary to measure both sides for comparison clavicle to nipple and mid line to nipple These figures will give both the vertical and horizontal displacement

Retraction of the Nipple This is a very noticeable feature in many cases of carcinoma, and it is usually accepted clinically as favouring that diagnosis

A carcinoma occurring anywhere in the breast, except right out at the periphery, commences its main lymphatic spread along the vessels which run parallel with the ducts to the sub areolar plexus As peri lymphatic fibrosis develops along the ducts, the ducts are shortened and the nipple pulled in Where the carcinoma develops right out at the periphery of the gland the lymph drainage may occur wholly in a centrifugal manner from the periphery into the nearest glands, without passing up to the nipple at all and hence no retraction occurs

A carcinoma which is spreading by continuity of tissue alone does not produce retraction of the nipple, and this may be a point of good prognostic import Simple tumours of the breast do not lead to nipple retraction

Where inflammation has been followed by marked fibrosis in the breast nipple retraction may be seen, but it is not a common finding It is essential to compare both sides to get the full value of the observation, as some patients normally have retracted nipples They are bilateral as a rule

Skin Much information can be obtained from a careful examination of the skin of the whole breast, including the areola, and it is of utmost value in gauging the spread in a case of carcinoma

with inspissation, is a source of irritation and, as such, a definite cause of pathology, which is more frequent in a breast of this type

PHYSICAL EXAMINATION GENERAL

The general examination calls for no special comment and the general indications of infection or malignancy are the same as usual In cancer of the breast there is no deterioration of the patient s general condition for a long time

PHYSICAL EXAMINATION LOCAL

Locally the bigger the breast the greater the difficulty in obtaining any detailed information While in flat-chested women, the smallest swellings may be easily seen, in big, heavy, full breasts not only may nothing be seen but quite often little can be felt.

INSPECTION

Is a Swelling Present? This can often only be decided by a comparison with the opposite side

If there is a swelling, is it diffuse or localised?

If it is diffuse, it is more in favour of inflammation than new growth, though an inflammatory focus may be localised (abscess) and a neo plasm may be diffuse (encephaloid carcinoma) It has also been mentioned that a cystadenoma may appear to be diffuse

If the swelling is localised, it is much more in favour of a neoplasm, though non neoplastic conditions can also produce localised swellings and neoplastic ones diffuse swellings If the lump is visible, on the average it is in favour of its being benign, but here again, benign tumours may not be visible and malignant ones may be The common type of malignant tumour the scirrhous carcinoma, is a flattish growth, and frequently instead of a lump, one sees a puckered retracted area

In young women the ordinary fibro adenoma is usually easily seen as at this age there is rarely an excessive deposit of fat In older women say thirty five years old the intra canalicular fibro adenoma may pro duce a marked projection especially if it be of any size, but, as this tumour is very prone to undergo malignant change, when it does so the malignant tumour resulting usually also forms quite a prominent swelling In such cases there is usually a long history of the presence of the original simple slow growing neoplasm

Side Over a large number of cases carcinoma is more frequently met on the left side

Quadrant The upper and outer quadrant of the breast is that most frequently involved in neoplasms especially carcinoma

Displacement of the Breast A large tumour by its weight will tend to increase the dependency of the breast but a small tumour usually

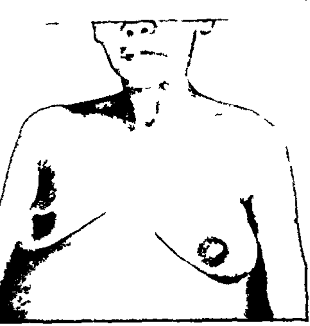


Fig 166 Paget's nipple Typical flat ulcer with disappe rance of nipp e



Fig 167 Encephaloid carci noma of the breast, with *peau d'orange* locally and generalisation (bones lungs and ovaries) No retraction of nipple



Fig 168 Scirrhous carcinoma of breast, with marked re traction of nipple and raising of whole breast



Fig 169 Scirrhous carcino of axillary tail with ma puckering of skin and pu of whole breast. No retract of nipple due to peripher site of primary

A localised area of puckering may be observed This is commonly seen over a carcinoma as it extends superficially towards the skin, either by continuity of tissue or lymphatics followed by fibrosis Where it results from spread by continuity, no oedema is seen, and even when the skin itself becomes part of the growth by infiltration still no oedema may be present Where it results from lymphatic spread, on the other hand, the superficial lymphatics become blocked by fibrosis skin oedema is usually present and it may or may not be localised to the area of puckering or dimpling

If the skin is infiltrated over the growth it usually becomes reddish or purple and may subsequently ulcerate, the ulcer presenting the typical picture of that of a carcinoma Oedema may be seen and it is often of the pigskin or *peau d orange* type showing a pitted appearance This is due to oedema of the cutis apart from the subcutaneous tissue and is caused by the non extensile nature of the ducts passing through the swollen cutis Its distribution is of significance and importance It may be limited to the surface of the growth, indicating a local lymph spread of the permeation type It may not be present over the growth at all but may be limited to the nipple and areola This indicates extension to the sub areolar plexus and local fibrosis It may involve most of the breast, but especially the lower part often indeed missing the skin over the growth

The nipple has oedema all round it, but the extent is much wider below the nipple than above it This indicates a block of the main drainage to the axilla and is usually the result of gross involvement of the axillary glands under cover of the pectoral

Finally the oedema may be diffuse and spread widely beyond the breast perhaps involving the opposite breast or extending laterally and backwards over the scapula This indicates a diffuse subcutaneous lymphatic spread by permeation It will be followed later by *cancer en cuirasse* The oedema of the subcutaneous tissue by itself does not give rise to the pigskin appearance but is smooth

Eczema As mentioned above the eczema of surgical importance is the unilateral one limited to the nipple and the areola which commonly precedes the development of the typical Paget s nipple Typically the Paget s nipple steadily loses all elevation until it is flush with the areola, and looks just like what the fully developed burn would be if a red hot halfpenny has been put on over it It is more or less circular in shape bright red in appearance flat with no raising of the edge and little discharge It is of importance because it is the forerunner of a carcinoma either an epithelioma on the surface or a spheroidal celled carcinoma underneath Both may be present at the same time

Evidences of Inflammation Most of what has been said above has had a special application to the neoplastic swellings of the breast, but

Fig 170 Carcinoma of breast with gross extension to skin by continuity of tissue and involvement of axillary glands

Fig 171 Carcinoma of breast with marked lymphatic extension to skin producing *peau d orange* or pigskin





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Fig 172 Scirrhous carcinoma of breast ulcerated and with secondary axillary gland also ulcerated Skin secondaries on medial side of breast and across mid line due to lymphatic permeation following block of main lymph drainage

Fig 173 Sarcoma of breast originating in a haemangioma ulcerated and fungating No nipple retraction

Fig 174 Cellular fibroma of breast ulcerated and fungating like a sarcoma Condition clinical sarcoma and malignant





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one must always bear in mind that inflammatory swellings of the breast will show the normal evidences of inflammation here as elsewhere, if the condition is superficial enough Redness and swelling and dilated vessels *must be looked for and registered*

Two important conditions must be noted in this connection An encephaloid carcinoma of the breast may show such a typical appearance of acute inflammation that the swelling may be incised as an acute abscess Further, not only may the local appearances mislead, but the patient will often run a temperature of 102° F with it, and so give the impression of acute inflammation more than ever If it is deeply situated, such a carcinoma may give the same dilated veins as would be met in a deep seated inflammatory focus The same is true of a sarcoma, which is usually associated with marked dilatation of the surface veins

On the other hand, a cystadenoma of the breast though a simple tumour, is often such an actively growing one, that huge veins run in the subcutaneous tissue over it, and it might give the impression of malignancy (Figs 167 179)

PALPATION

In palpating the breasts for swellings, the flat of the hand must be used, the breast being compressed between it and the chest wall Any breast if picked up between the fingers and thumb, will give the impression of a lump, because of the firmness of the breast tissue as compared with that of the subcutaneous fat This is the reason that introspective patients will frequently come because they have found a lump in the breast, when no lump exists

Another fallacy so far as the patient is concerned is the feeling of a prominent costo-chondral junction which may be interpreted as a tumour The important observation then is whether a lump can be felt with the flat of the hand Tumours are always so felt but the thickenings associated with chronic interstitial mastitis are not felt unless cysts of considerable size are present with thick fibrous walls In very pendulous breasts extra information can sometimes be obtained by palpating them between the hands i e one behind between the breast and the chest wall and the other in front The flat of the hand and the fingers are used in both Especially the consistency of a lump may be minutely gauged by this means

The breast should be palpated with the patient both in the recumbent and in the sitting posture As a rule the recumbent posture gives more ease and therefore more information but early fixation of the breast may be better appreciated with the patient sitting as slight elevation may be obvious only then

Is there a Tumour? This is to be judged by the flat of the hand Most tumours are obvious on this examination but the lumpy breast of chronic

interstitial mastitis shows no gross irregularity unless cysts of considerable size are present This is a good differential clinical point It may be stated as follows —The absence of a lump with the flat of the hand excludes a carcinoma at the stage it is usually seen and favours chronic mastitis, but the presence of a lump does not exclude chronic interstitial mastitis

If a *lump* is present, is it single or is there more than one? Multiplicity of lumps strongly suggests simplicity as malignant lumps are rarely multiple The multiplicity is not confined to neoplasms, as multiple cysts in chronic interstitial mastitis are common

The General Shape The simple tumours are much more likely to project than malignant ones The ordinary scirrhous carcinoma is flat like a half bun Those carcinomas however, which commence in inter canalicular fibro adenomata remain projecting and so also do the more actively growing encephaloid type of carcinomas Many of the cysts of chronic interstitial mastitis are flattish antero posteriorly

The consistency, surface edge and relations of any swelling must now be ascertained and most of them, as would be expected, conform to their pathology

Consistency In these swellings one gets anything from fluctuation to stony hardness and before being satisfied as to consistency it is essential to palpate well down on to the swelling, as a thick layer of superficial fat will help to give the impression of a much softer mass if it is not palpated firmly A deceiving feeling of fluctuation over the prominent part of a carcinoma is sometimes brought about by extension towards the skin and fibrosis along the corresponding lymphatics cutting off a well defined area of the subcutaneous fat This may suggest that it is the tumour itself which is fluctuating and so alter the outlook and therefore careful examination must be made

While cysts often give fluctuation the more tense they are the harder they feel and they may be indistinguishable from the stony hardness of a carcinoma This is especially well exemplified in the serous cyst the result of an old haemorrhage where the organisation of the clot may give a wall of fibrous tissue half an inch thick They are often the hardest lumps felt in the breast

The intra canalicular fibro adenoma often feels harder and less elastic than the ordinary peri canalicular fibro adenoma of young women, which is firm and elastic The cystadenoma varies in its consistency in the different solid or cystic portions The scirrhous carcinoma is stony hard and this description negatives elasticity though this may be sug g ted through fat The encephaloid carcinoma may offer anything from oedema and fluctuation to a very hard swelling depending on degenera tion haemorrhage or simple solid infiltration The same applies to sarcoma except that oedema is rarely seen Stretching and glossiness of the overlying skin is the usual appearance in the larger growths



Fig 175 Carcinoma of breast breaking through the skin by infiltration—typical crater ulcer



Fig 176 Carcinoma of breast treated by corrosive plasters



Fig 177 Specimen Carcinoma of the breast treated by corrosive plasters Section shows marked but incomplete necrosis of growth



Fig 178 Surface view shows scarring round the present crater ulcer

tumours there is no involvement of any of these structures The cystadenoma may appear to be an exception, since its rapid increase in size may cause great stretching of the skin and give the impression of involvement Careful palpation will usually demonstrate its freedom It may be destroyed by outside pressure or friction

Inflammatory conditions may infiltrate the overlying skin when they are progressive and when they do the surface appearances are those usual of inflammation, viz, redness, swelling heat and pain, with and apart from manipulation

Destruction depends on the termination of the inflammation In sarcoma the skin becomes stretched over it rather than infiltrated, and destruction is usually produced because the growth underneath interferes with its blood supply In carcinoma the essential involvement is an infiltration by the growth so that the skin becomes an integral part of it, and so is replaced by the tumour cells The skin usually becomes tucked down to the growth before actual infiltration occurs and there may or may not be oedema with this

Destruction of the skin and ulceration over the different swellings varies in its detail though in all cases it results from interference with its vascular supply

In the simple tumours subcutaneous tension is never sufficiently raised to interfere with the skin blood supply with the possible exception of the cystadenoma Consequently, ulceration is produced as in a pressure sore It is superficial but with superadded sepsis it may extend into the tumour

In the inflammatory conditions, ulceration depends on the termination of the inflammation and it is part therefore of the inflammatory process with the usual features

In sarcoma the blood supply of the skin is cut off underneath and the skin sloughs over the tumour allowing it to fungate through the break in the surface The edge of the ulcer in such cases is at first undermined and is not part of the sarcoma though it may ultimately become so

In carcinoma the skin is replaced by the growth and the ulcer, when it occurs is part of the carcinoma i e it is a typical carcinomatous ulcer fungating or crateriform with raised everted edge and in all cases with growth in excess of destruction In the carcinoma cases confirmation of puckering and adhesion to the growth and possibly oedema, should be sought as these frequently precede ulceration

Involvement of the pectoral muscles and chest wall is chiefly of importance and interest in cases of carcinoma affecting the prognosis Involvement of the pectoral muscles and fascia fixes the growth so that it can only move across the direction of the fibres when the muscle is contracted and not along them On the other hand, when the growth involves the bony chest wall it becomes fixed under all conditions and in every direction

The chronic interstitial mastitis of retrogressive breasts gives lumps, often multiple, which may be very difficult to distinguish from carcinoma, but which are usually not so hard, especially if cysts are present

Surface The simple tumours are smooth or, if lobulated, the individual lobules are smooth This, however, may appear to be contradicted in some of the intra canalicular fibro adenomas, which push out very small lobules from the surface, often too small to feel like anything more than an irregularity The peri canalicular fibro adenoma is often small and not lobulated

Carcinomas are irregular wherever we feel the surface, due to the surrounding infiltration by continuity of tissue It may either be grossly or finely irregular according to the degree of infiltration In small carcinomas in big breasts it may be very difficult indeed to get a very clear idea of the surface

In the carcinoma developing in an intra canalicular fibro adenoma, the swelling retains its prominent lumpy feel, but the smoothness of its lobular surface tends to disappear, as infiltration progresses

In the sarcomas the surface is usually smooth but lobulation may occur the lobules also being smooth It may closely simulate a simple tumour except for its rate of growth

In chronic interstitial mastitis the masses composed mainly of fibrous tissue usually give a more or less granular surface, while associated cysts if fairly large, may be smoother, though many of these also present a granular surface

Edge The simple tumours, as usual have a well defined edge, and, if not too large often appear to slip about in the breast tissue In early carcinomas whether scirrhous or encephaloid especially in big breasts the edge may appear to be fairly well defined In the encephaloid type its rapid increase early tends to displace the adjacent tissue as well as infiltrate it and a sort of spurious capsule is likely to be formed, rather like a sarcoma, which tends to remain very well defined clinically, though the spurious capsule shows infiltration

In the well developed carcinoma the edge is very ill defined and characteristically shelving into the surrounding structures imperceptibly blending with them This is important to grasp as the clinical edge may be far short of its microscopic growing edge

In chronic interstitial mastitis the edges of the areas of lumpiness conform more to those of carcinoma, i e they tend not to be well defined but rather to shelve into the surrounding breast tissue The edge often displays the same granularity as the surface

It is important to bear in mind in view of what has been described above that an early carcinoma especially in a big breast may often be indistinguishable from a simple non malignant swelling

Relations to the skin the pectoral muscles and the chest wall In simple

Lymphatics There can be no doubt that lymph spread of carcinoma, like that of any other infective focus takes place chiefly along the main lymph drainage of the part in this case involving the axillary glands As, however, the periphery of the breast drains also centrifugally, the *outlying carcinomas may also or only take this path, and so involve* the supra clavicular mediastinal or subscapular group of axillary glands directly

Centrifugal spread of carcinoma by permeation of surrounding lymphatics is a corollary to extension by continuity but is not necessarily an important mode of extension Spread by continuity of tissue involves the tissue spaces, which are the beginnings of the lymphatic drainage and it is not limited to any part of the periphery of the growth

Spread by permeation, depending on its extent, may give rise to enlarged lymph glands throughout the secondary drainage area A further important event is quite frequently seen in extension by lymphatic drainage Involvement of the main glands of drainage may completely block the lymphatics supplying them in which case the drainage must take place by subsidiary channels and anastomoses In such cases glands in the secondary area become involved This is well seen in the involvement

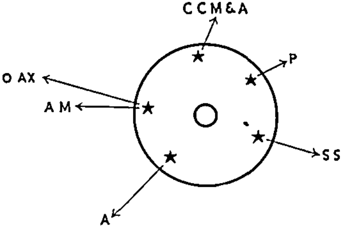


Diagram of a breast with peripheral foci of carcinoma showing the direct peripheral spread
C C M and A Costo-coracoid membrane and the apex of the axilla
P Pectoral group of axillary glands
S S Subscapular glands
A Lymph spread into abdomen
A M Anterior mediastinal glands
O A X Opposite axilla

Involvement of skin over the swellings of chronic interstitial mastitis is a very rare occurrence and is probably due to some additional infection, leading to fibrosis outside the breast tissue Ulceration does not occur

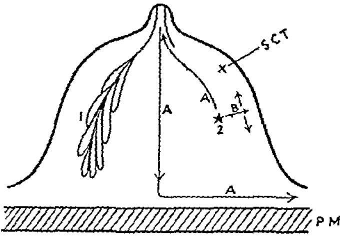
EVIDENCE OF DISSEMINATION

Evidence of dissemination relates essentially to malignant disease, especially carcinoma The carcinoma may spread as usual, by continuity, contiguity, the lymphatics and the blood stream and all avenues must be investigated

Continuity The commonest extension is to the overlying skin, and the infiltration is foreshadowed by the tucking down of the skin to the growth In these cases no oedema is present Deep extension progressively involves the pectoral fascia pectoral muscles, chest wall both bony and subjacent parietal pleura, and pericardium rarely The peritoneal cavity may also be invaded through the epigastric angle partly due to continuity but probably mainly by lymph spread

Contiguity Opposed skin e g in the thoraco mammary fold may be involved in this way, but probably most cases are by continuity of tissue mainly

Should the parietal pleura pericardium, or peritoneum be involved contiguity spread in these cavities is the rule and is commonly wide spread



★ Focus of carcinoma

1 Diagram of a lobule of the breast with its duct
2 Outline of a lobule with a focus of carcinoma
S C T Subcutaneous tissue
P M Pectoralis major with overlying fascia
A Main lymphatic drainage first to subareolar plexus then down to the pectoralis fascia and then out to the axillary glands
B Minor lymphatic drainage through to the subcutaneous tissue and then wide spread by permeation

of the axillary glands of the opposite side, following drainage through the diffusely anatomosing vessels in the subcutaneous tissue This main lymph drainage block is chiefly responsible for those cases of wide spread lymphatic permeation which are rarely seen when the main drainage remains free

An important gauge of lymph spread is often seen in these cases of secondary extension by the development of subcutaneous oedema in the affected area As the oedema is of the non pitting type, it is the relative thickness and hardness of the subcutaneous tissue compared with the opposite side which presents the information with regard to it It is, naturally, an extremely bad prognostic sign and indicates the hopelessness of any surgical attempt at eradication

Blood Stream Extention to the lungs, liver, bones and skin are particularly noteworthy The lung secondaries may suggest themselves from respiratory embarrassment or pain but in early cases they are diagnosed radiologically

The liver secondaries give rise to the typical features of secondary carcinomatous liver, probably with a slight degree of jaundice and possibly ascites

The bones most commonly involved are the main limb bones the spine the sternum and the ribs In the limbs it is commonly the proximal ends of the proximal bones which are affected and they may be affected either by the blood stream when they are central deposits, or by lymph spread along the fascial planes connecting the trunk with the limbs, when they are more likely to start sub-periosteally Wherever they occur they give rise to a local boring pain which is commonly regarded as rheumatism by the patient while in the spine, as extension takes place, root pains may develop

The radiological appearance is usually that of a destructive osteolytic process with rarefaction, but in the most chronic cases there may be a good deal of sclerosis produced at the site of the secondaries

The skin secondaries occurring locally are usually due to local lymph spread but those occurring widely over the body are probably blood-borne though in some cases they appear to be associated with a wide spread permeation extension They are in the skin and often herald their approach by pain at the site (Figs 180-183)

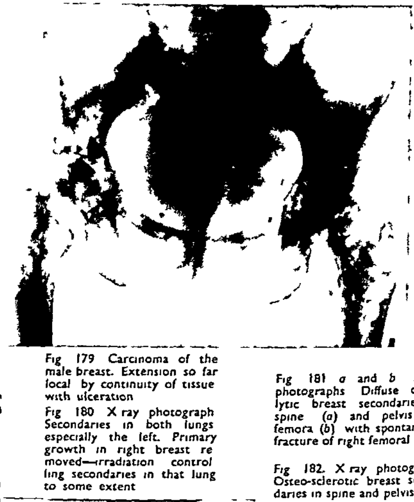
In all cases of breast lumps it is necessary to examine the other breast since while neoplasms are uncommonly found in both breasts, the swellings of chronic interstitial mastitis are commonly so distributed At the same time one must remember that the intra canalicular fibro-adenoma may not only be present in both breasts but may be multiple in both





180





181b

Fig 179 Carcinoma of the male breast. Extension so far local by continuity of tissue with ulceration

Fig 180 X ray photograph Secondaries in both lungs especially the left. Primary growth in right breast removed—irradiation controlling secondaries in that lung to some extent

Fig 181 *a* and *b* X ray photographs Diffuse osteolytic breast secondaries in spine (*a*) and pelvis and femora (*b*) with spontaneous fracture of right femoral neck.

Fig 182. X ray photograph Osteo-sclerotic breast secondaries in spine and pelvis

Fig 183 X ray photograph Osteo-sclerosing breast secondaries in pelvic bones and femora.





184a 184b



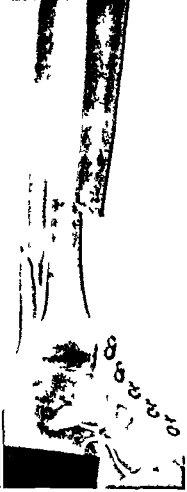


Fig 184a and b (a) Chalk broken over fulcrum (direct violence) with resultant transverse frac ture (b) Chalk broken by twisting ends in opposite directions (indirect violence)—fracture oblique and spiral

Fig 185 X ray photograph Transverse fracture of tibia and fibula from direct violence roughly same level

Fig 186 X ray photograph Oblique spiral fracture of tibia and fibula from indirect violence (twisting force) Typical lower one third of tibia and upper one third of fibula

Fig 187 X ray photograph Transverse fracture of patella from muscle pull over fulcrum of femoral condyles

185



185



SCHEME XII

FRACTURES IN GENERAL SPECIAL FEATURES

In considering fractures it is most important to remember that they are simply one type of injury often a severe one, and, therefore, conform to what has been said about injury and also that, from a pathological point of view the fracture is a wound of a bone identical in every respect with any other wound, except that it may be sub-cutaneous and it involves a hard rigid tissue.

HISTORY PRESENT CONDITION

Duration since Occurrence This is very important as, in common with all injuries, much may happen in a few hours. The sequence (1) stage of shock, (2) stage of recovery from shock, and (3) stage of local complications, applies perfectly The question of shock, haemorrhage and sepsis is, therefore, intimately bound up with this time relationship

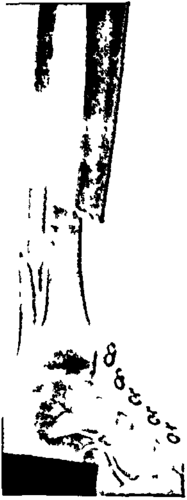
Cause The cause may be direct or indirect violence, or muscular action, which partakes of the nature of direct violence. Direct violence is the application of a force directly to the bone, e.g. a kick on the shin and the bone breaks at the site of application of the force. Indirect violence is the application of a force at some distance from the site of fracture, but the strain produced causes the fracture. The direct violence produces a transverse while the indirect gives rise to an oblique or spiral fracture. This is well illustrated in the tibia where a kick produces a transverse break while fixation of the foot with rotation of the leg leads to a spiral oblique fracture of the lower third of the tibia. This can be well demonstrated with an ordinary piece of chalk—the break over a fulcrum is transverse, while that produced by taking hold of each end between the finger and thumb and twisting in opposite directions gives a spiral break.

Two different classes of case are seen as the result of muscular violence. Fracture of the patella is produced in this way by strain applied through the quadriceps when the knee is flexed. The patella is broken across a fulcrum formed by the condyles of the femur and the fracture is transverse. Exactly the same thing happens with fracture of the olecranon. In the case of avulsion of the tuberosity of the humerus or the back of the calcaneus, on the other hand, the bone is broken by being pulled directly off the main portion This is also direct violence (Figs. 18[illegible]–18[illegible])

The severity of the force applied is also an important point as this will in many cases determine the seriousness of the occurrence, e.g.,

184a 184b





185

Fig 184a and b (a) Chalk broken over fulcrum (direct violence) with resultant transverse fracture (b) Chalk broken by twisting ends in opposite directions (indirect violence)—fracture oblique and spiral

Fig 185 X ray photograph Transverse fracture of tibia and fibula from direct violence roughly same level

Fig 186 X ray photograph Oblique spiral fracture of tibia and fibula from indirect violence (twisting force) Typical lower one third of tibia and upper one third of fibula.

Fig 187 X ray photograph Transverse fracture of patella from muscle pull over fulcrum of femoral condyles



185



the degree of shock produced and the amount of damage to the affected bone and adjacent structures Ordinarily, considerable force is required to break a normal bone, and should the force have been less than what would have been expected, it is strongly suggestive that the affected bone is not normal, e g , a woman of forty five years swinging her legs over the edge of the bed as she gets up, snaps her femur This is undoubtedly an inadequate force to break a normal femur and constitutes what is sometimes called a spontaneous fracture Such an event would immediately suggest a search for some underlying pathology, leading to weakening of the bone, such as carcinoma of the breast with a secondary deposit in the femur It is imperative to investigate such a case thoroughly (Figs 189 200)

The ordinary sequence of events, when a fracture occurs, is as follows

An audible crack, often like a pistol shot when the bone breaks It can often be heard a distance away

Pain This, as usual, impresses the patient It occurs at the same time as the fracture and may increase afterwards The fracture of a normal bone will usually give more pain than a spontaneous fracture, the violence in the former case being much greater than in the latter, indeed the pain may be severe enough for the patient not to hear the noise of the break

Haemorrhage is usually responsible for the pain afterwards leading to tension in the tissues It may be especially severe in those cases where the periosteum remains intact and the bleeding, therefore produces great tension It is usually not so severe but may still be great, where the periosteum is torn and the bleeding takes place into the surrounding tissues On the other hand, if the fracture is compound and the blood can escape the pain is usually much less except on movement The pain is felt at the site of fracture

Loss of Function This varies very greatly depending on the function of the affected bone It occurs at once with the fracture, and while it is mainly due to the fact that the bone which was previously rigid is now flail it is in part due to the pain which results and which is likely to be aggravated by movement

In the lower limb, e g , where the bones support the weight of the body and maintain the erect posture the functional loss leads to his falling to the ground In the case of the upper limb, where no such support is given to the body as a rule it simply falls limp to the side of the body and cannot be lifted Where a bone is well supported all round the loss of function will be almost entirely due to pain

Deformity The bone fragments are usually displaced at the site of fracture If the force continues to act at the site of the break, deformity results The collapse of the bone or muscular contraction may also be responsible There is great variation both in degree and type

Where the periosteum remains intact it may act as a splint and no

168a



188b



Fig 188 a and b X ray photograph (a) Avulsion of tuberosity of humerus by muscle pull (b) Avulsion of lesser trochanter by pull of psoas.

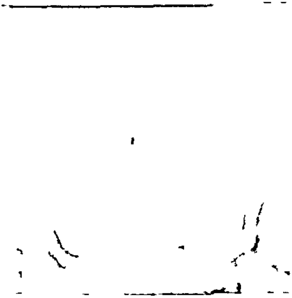


Fig 189 X ray photograph Multiple spontaneous fractures in a case of osteogenesis imperfecta



Fig 190 X ray photograph Spontaneous fracture of femur in a case of chronic pyogenic osteitis



Fig 191 X ray photograph Spontaneous fracture of humerus in case of tuberculosis of upper end



192



193

Fig 192 X ray photog Spontaneous fracture humerus in a case of con syphilitic osteitis Di ment slight

Fig 193 X ray pho Spontaneous fracture humerus in a case of a cyst



194a



194b



195



Fig 194 *a* and *b* Photograph and X ray photograph Multiple spontaneous fractures of *femur in case of extreme in*volvement of the bone by hydatid disease

Fig 195 X ray photograph Spontaneous fracture of *femur in* a case of fibrous dysplasia

Fig 196 X ray photograph *Spontaneous fracture of* ischium in a case of Paget s disease



193



199

Fig 201 *a* and *b* X ray photographs Two views of same fracture taken from different positions A.P and P A to show the importance of this programme The fracture could easily be missed in one view



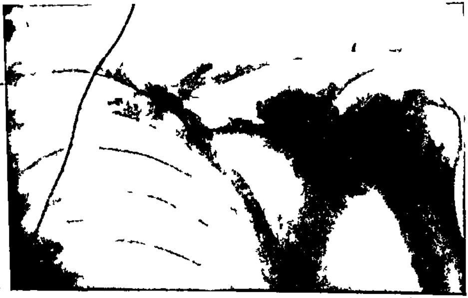
200a 200b

Fig 197 X ray photograph Spontaneous fracture of femur in a case of osteolytic sarcoma

Fig 198 X ray photograph Spontaneous fracture of fibula in a case of osteogenic so called periosteal sarcoma

Fig 199 X ray photograph Spontaneous fracture of femur from metastasis in carcinoma of breast

Fig 200 *a* and *b* X ray photographs Union of spontaneous fracture of tibia in case of fibrous dysplasia



201a



deformity occur The presence of a second bone alongside may have the same effect The displacement may consist of angling overlapping, lateral displacement or impaction, where one fragment is rammed into the other As a rule, whatever deformity takes place, shortening of a long bone will always result

Swelling Swelling varies in its cause with the time factor The initial swelling is due to the displacement of the bone ends It occurs immediately, is usually due to the action of the force, followed by collapse of the bone and then muscular contraction

Following closely on this is swelling due to haemorrhage, which occurs freely and persistently from the bone It is likely to be greater in simple than in compound fractures where the blood can escape to the surface The more superficial the bone the more quickly the swelling occurs, and the more localised it is at the beginning In deep bones like the femur it is diffuse

Inflammation is likely to be the next cause in order of time, with *inflammatory exudate It is especially likely to occur in compound fractures* and usually takes 2 3 days to appear

Callus formation is the next, occurring later still Temporary callus begins to form in about ten days and this is gradually replaced by the permanent callus in three weeks Its tendency is to disappear gradually after union of the fracture

A much later and perhaps doubtful cause of swelling is that due to a sarcoma at the site of fracture While the fracture may have occurred at the site of a sarcoma there seems little doubt that the neoplasm sometimes follows the injury

Ecchymosis Staining of the superficial tissues with blood in cases of fracture, because of the extensive nature of the bleeding from the bone, is the usual event It appears more quickly, perhaps a few hours, *in superficial bones,* but may take three or four days in *deeply placed* ones, e g, in fractures of the posterior fossa of the skull with haemorrhage into the muscles of the back of the neck

It is usually very extensive and distributed widely from the seat of fracture e g in a Pott s fracture it may extend above the knee This great extent of it is so unlike a soft tissue injury that its presence strongly suggests a fracture in those cases where none of the usual signs may be present It is more likely to be widespread in simple than in compound fractures as the blood can escape in these

A further indication of the extensive nature of the haemorrhage is the appearance of vesicles or bullae under the skin the result of the serum being squeezed out of the deep clots This also strongly suggests the presence of a fracture

Undue or *abnormal mobility* results from the loss of stability of the bone With its rigidity gone movement may take place in any direction,

e g, lateral mobility in the thigh It may be controlled to a varying extent by the pain it causes the patient putting his controlling muscles into voluntary spasm

With care and patience a remarkably detailed history may be obtained from an intelligent patient, who has not been knocked out by shock, or suffered a fracture of the skull, with possible unconsciousness

PREVIOUS HISTORY

In the vast majority of cases it is the first and only fracture and there is no previous history bearing on it On the other hand, there may be a history of multiple previous fractures suggesting some general bone abnormality or a story of local bone disease preceding the fracture Previous fractures however, do not necessarily presuppose bone abnor mality, as half a dozen fractures may not be uncommon in wild, careless or incompetent horse riding

PHYSICAL EXAMINATION GENERAL

In the general examination depending on the time relation, the patient must be examined for evidence of shock, haemorrhage and sepsis

In the average closed fracture shock is more likely to be evident than haemorrhage but the haemorrhage may become a much more prominent feature if the fracture is compound An exception to this is seen in cases of fracture of the ribs where profuse haemorrhage may occur into the pleural cavity

Other injuries must be looked for, since these may be as important as if not more so than the fracture

PHYSICAL EXAMINATION LOCAL

Always have a full exposure and examine both sides for comparison Bones are like noses what may be regarded as normal in one person may be considered grossly abnormal in another

INSPECTION AND PALPATION

In the examination whether by inspection or palpation confirmation or negation is looked for of the various points given by the patient in the history

Swelling As mentioned above this may be due to a variety of causes, depending on the time relationship viz displacement haemorrhage, inflammation callus and neoplasm The swelling will naturally vary in its features with its cause If palpation can be carried out in detail though it often cannot because of pain the broken ends of the bone may be clearly defined Haemorrhage and inflammation produce a diffuse swelling with poor delimitation and the bony parts may not be palpable so that *nothing of bony hardness is felt* In both cases there is likely to

be extensive oedema, in the haemorrhage from the bleeding and the squeezing out of the serum into the tissues in the inflammation due to exudate Callus produces a much more localised swelling and as time goes on it becomes smaller and better defined It is bony hard

A neoplasm will be a very late development and its features will depend on its nature chiefly the presence and degree of osteogenesis

Deformity As mentioned above, the deformity is due to displacement, and may be angling, overlapping, lateral displacement or impaction In children the angling, rather more of a bowing, is an incomplete fracture and is described as a greenstick fracture as the elastic bone only breaks on the convexity of the bend

There may be no displacement at all, especially where the periosteal sleeve is intact or a second bone acts as a splint

Whatever type of displacement occurs, there is usually shortening of a long bone present While one recognizes that muscle contraction may be instituted by the patient to control movement at the fracture and so pain, this contraction may serve to aggravate the deformity by pulling the fragments more out of place

Ecchymosis As already mentioned this varies in the time of its appearance, is usually very extensive, is more so in a closed than an open fracture, and soon presents the development of vesicles on the surface containing blood stained serum This picture itself is strong circumstantial evidence of the presence of a fracture without further examination

Patient's Ability to Move the Affected Part This is chiefly a question of pain and the mobility of the parts

In a case where there is no displacement as referred to above the parts are relatively rigid and movement as a whole may be carried out with little or no disturbance of the fracture, and in such cases the patient will also be able to move it But as a rule the patient is unable to use the affected part, because of the free mobility of the fragments and loss of control together with the pain which results from attempted movement

Palpation More Particularly

In the above palpation has been partially considered with inspection In palpation an essential point if the patient s confidence and co operation are to be obtained and kept is to do those things, which do not hurt first Once the patient s confidence is lost co operation disappears and difficulties are correspondingly increased

Relation of the Bony parts in the Region By comparison with the unaffected side displacement and deformity are likely to become evident This is particularly of value in injuries in the neighbourhood of joints

Measurements This is chiefly in relation to shortening of the long bones but special measurements may be required in special fractures e g neck of femur It is essential for comparison to have both limbs

in identical positions Shortening does not necessarily mean overlapping it may be only angling

Abnormal Mobility Here one seeks to confirm the patient s demonstration of it or to establish it if the patient has failed to do so While it may produce pain it is often much less painful than when the patient tries to do it by contracting his controlling muscles It may also fail because of pain Naturally there is no movement at all in the length of a normal rigid bone

Crepitus This is the grating of the fractured ends on each other As a rule it is not tolerated well because of pain and this alone may make it unobtainable *It may however be absent when the movement can be carried out and in this case it is usually due to the inter position of soft* tissues between the bone ends e g muscle or fascia An excellent example is seen in the ordinary transverse fracture of the patella The aponeurosis of the quadriceps is also split transversely but not at the same level and it overhangs the front of the upper fragment as a rule though sometimes the lower fragment The ability or failure to obtain crepitus in such a case may make all the difference between conservative and operative treatment and it is therefore of first rate importance *If the fragments can be brought into apposition and no crepitus can* then be obtained it means that the quadriceps expansion is still between them and also that bony union will not occur without open operation and the removal of the intervening expansion It is also necessarily absent in greenstick fracture (partial)

Crepitus when obtainable especially if of course type is a very strong point in favour of fracture What is known as soft crepitus may be felt and it may or may not be associated with fracture *In epiphyseal* separation which is the equivalent of a fracture between the epiphyseal cartilage and the shaft of a long bone the grating is of a soft rubbery type and none of it is coarse unless the adjacent shaft is fractured This same type of crepitus is felt in teno synovitis on moving the tendon in the sheath and it is also found when cartilaginous surfaces move on one another e g in osteoarthritis

COMPLICATIONS

These as usual are produced by extension of the original injury sepsis or secondary infection and the healing process Extension of the injury may occur at the time of the fracture when the force causing it continues to act and involve other structures e g skin vessels nerves joints and underlying viscera if any are in relation to the fracture

At the same time the doctor may produce the same result either by his manipulation or his treatment and it is essential therefore if only for his own sake to safeguard himself that he should know whether the complications were present before he began his interference

If he failed to establish this, even though it were certainly true nothing later will be likely to convince the patient and those concerned that he, himself, was not responsible Manipulation may produce exactly the same injuries as the movements of the bones at the time of fracture but the treatment, which is usually by splinting in one form or other is more likely to produce pressure sores and vascular interference Infection and inflammation may occur at the time of fracture or later and affect the outlook very markedly Callus formation on the other hand is a very late cause of complications being usually through an excessive mass of it producing mechanical interference with joints or pressure on nerves etc

Skin Involvement This is the commonest complication and its import ance cannot be overestimated, as it carries with it the likelihood of sepsis with all its horrors It may be produced by the agent which caused the fracture or it may be brought about by the end of the broken bone sticking out in other words it may be produced from without or from within This is a very important point since the sepsis introduced by the agent is likely to be much more serious in amount and virulence includ ing dirt, soil clothing etc than when it is limited to the patient s own skin and microbes to which he usually has at all events a partial im munity Careless first aid treatment may possibly force a broken end through the skin

Vessels The main vessels may be either pressed upon or torn and a most important accessory factor in the prognosis of both occurrences is the likelihood of interference with the collateral circulation often precipitating gangrene usually the result of extensive blood extravasation or gross damage to the surrounding soft tissues

Nerves Nerve injury does not as a rule entail loss of a limb but the patient s wage earning capacity may be so crippled as to equal that catastrophe Like other complications it may arise at the time of injury from manipulation as the result of treatment or be due to callus either enclosing or pressing on the nerve It is essential that the doctor should not only recognise its presence but that he should also know when and how it occurred

Joints Joint injuries associated with fractures rarely occur except at the time of the fracture The fracture may extend into the joint or a dislocation may be present at the same time The seriousness of this complication is greatly increased by its not being recognized as in those circumstances quite the wrong treatment may be given and untold dis ability result Failure to recognize this complication could be interpreted as neglect and malpractice An extenuating circumstance is the fact that the haemorrhage and swelling of the injury may mask it unless there is dislocation or gross deformity

Underlying Viscera Injury to viscera is, naturally, of the greatest importance depending on what they are and whether solid or hollow Those likely to be affected will be readily suggested by the position of the fracture e g skull chest pelvis etc The individual features of such an event are special to the part and require no description here, but shock haemorrhage sepsis and functional damage due to the particular viscus cover most of the ground

SPECIAL EXAMINATION

Radiography It is well to keep in mind that in a case of suspected fracture, a radiograph should never be omitted if it is at all possible to have it done Such an omission could be regarded as neglect on the part of the medical attendant

Further we are not justified in giving an opinion unless we have two views taken at different angles usually antero posterior and lateral A fracture may look perfectly good on one and dreadful on the other (Fig 201)

It is well to remember that we may get marked deformity without a complete fracture e g greenstick but we may have a complete fracture without any deformity This was referred to in those cases of transverse fracture with intact periosteal sleeve especially if a second supporting bone is present In a greenstick fracture with the break only on the convexity of the bend straightening of the bone usually makes the fracture complete but deformity does not occur as the periosteum is intact

SPONTANEOUS FRACTURE

The question of spontaneous fracture has been mentioned as one occurring from violence which would not break a normal bone If this is suspected then it behoves the medical man to look for any possible cause of bone weakness Such conditions are many and they may be general or local They may be classified as follows

1 General bone disease e g, fragilitas ossium osteomalacia etc Fragilitas ossium is usually seen in young patients and is often familial Two cousins had between them over twenty fractures Osteomalacia is usually seen in parturient women but has also been met in men Other conditions might be mentioned such as rickets Paget s disease etc

2 General condition of the patient leading to atrophy of bones, e g being bed ridden or widespread nerve conditions, such as locomotor ataxy where disuse atrophy is mainly responsible for the weakening

3 Local bone disease viz (*a*) inflammatory—acute pyogenic chronic tuberculous or *syphilitic disease*, (*b*) *neoplasms* e g, giant cell tumour sarcoma (*c*) cysts hydatid etc

4 Primary malignant disease elsewhere, either sarcoma or carcinoma but chiefly carcinoma of the glandular organs, e g , breast, thyroid kidney prostate It is worth remembering that a fracture at the site of a secondary carcinoma is much more likely to unite than one at the site of a sarcoma

It will thus be appreciated that the possibility of a spontaneous fracture carries with it an extensive and maybe exhaustive investigation

SECTION VI

DISEASES OF LONG BONES

SPECIAL FEATURES

HISTORY PRESENT CONDITION

Duration As usual the duration is controlled in great measure by the pathology and the observation of the patient Acute infective conditions are so excessively painful that the patient s attention is not distracted for long Chronic conditions however whether inflammatory, neoplastic or due to other disease vary in their symptoms of which pain is the most important and swelling may or may not be a prominent feature so that the duration as registered by the patient may vary widely Hence while a long duration means a chronic condition whatever the cause, a short history does not necessarily mean an acute one

Initial Injury Infection with inflammation is by far the most common pathological condition met in bones and in a large proportion of these there is a history of injury The trauma described is as a rule, of a minor nature and probably is not really responsible at all Further, major injuries are not usually followed by disease e g a fracture if not compound rarely becomes infected One must remember that the body is continually being subjected to trauma which is quickly forgotten unless something draws the patient s attention to some part of his anatomy

Pain Pain in bone disease is of a boring aching character, as a rule worse at night e g toothache In the presence of an abscess throbbing may be met as elsewhere Its severity depends on the tension present, and this on account of the rigidity of the bony structure readily becomes excessive In acute inflammation the pain rapidly becomes extreme In chronic inflammation whether due to tuberculosis or syphilis pain is much less marked but here again it depends on the relative virulence of the infection and the resulting activity of the focus e g in syphilis where the mildness and the chronicity are so marked as to result in a diffuse sclerosis of the bone there may be little complaint but should the patient come with a complaint of very considerable pain one can say without hesitation that areas of caries and rarefaction will be seen radiologically at the site of most pain though sclerosis will still probably be present as well

In neoplasms the amount of pain depends on the rate of growth in other words on the activity of the tumour The more the tension

produced, the more the pain Should haemorrhage take place into the tumour, there is usually an exacerbation of the pain It is a pronounced feature of bone conditions that the pain is more severe when the patient is abed at night, as the limbs get warmed up

It is often a very important point to determine the exact situation of the pain, and in the acute conditions it may be a question of life and death Most bone diseases are met with in young patients and, whatever their nature, especially inflammatory or neoplastic they tend to start in the metaphysis of the long bones i e just on the shaft side of the epiphyseal cartilage in other words, close to the neighbouring joint

Pain in this situation is usually described as rheumatism by the layman and is often accepted as such by the doctor But rheumatism is a disease of joints and is commonly a medical complaint and dealt with by medicinal and other non operative treatment The tender spot, however, in cases of osteitis is not over the joint but over the metaphysis, and this should clear up the issue It is no uncommon story to find a young patient with acute pyogenic osteitis diagnosed as rheumatic fever and treated as such till septicaemia or even pyaemia has developed when the case may be hopeless from the surgical point of view

Rigor A rigor is only likely to be seen in an acute pyogenic infection where it is almost the rule Its repetition is of particularly serious significance not only indicating the high virulence of the infection but also often a blood spread of it

Fever is likely to be present with any inflammatory condition but the patient will probably be unaware of it except in the acute osteitis cases where the temperature may reach 103° F or more

In the chronic inflammatory conditions it may be slight or absent while in the neoplasms it is not usually seen except with haemorrhage and degeneration of the growth and therefore more probably in the more rapidly growing ones

Swelling Swelling is a common feature of most surgical bone conditions though it may not be registered by the patient Naturally it occurs at the site of the pathology and consequently in young patients it is usually in the region of the metaphysis In older patients on the other hand if the disease commences after the union of the epiphyses there is no predilection for the metaphysis and commonly the middle third of the shaft is the site of the swelling

Inflammatory swellings are much more likely to break down with discharging sinuses than other conditions usually without reaching a large size and this is especially so in acute pyogenic and tuberculous infections In chronic pyogenic and syphilitic infections considerable swellings may develop without sinus formation In the neoplasms breaking down any sinus formation is the exception and consequently very large swellings may develop without any sign of the skin ulcerating

the mouth, the throat and the skin, in tuberculosis, the neck and the chest, and in syphilis the face, the eyes, the mouth and the legs

In possible neoplasms look for cachexia loss of weight and generalisation

A blood examination may be of the greatest possible importance, especially in an acute case, where rheumatic fever may have to be excluded The leucocyte count, total and differential, is the chief surgical investigation usually required, and a blood culture must be carried out A Wassermann test reaction may also be important Laboratory tests, e g, phosphatase, etc, should be done if considered necessary

PHYSICAL EXAMINATION LOCAL

Always examine both sides for comparison Irregularities which may be taken to be pathological, might prove to be simply variations within the normal for that person, as these are usually bilateral

Inspection

Swelling The size of the swelling may be important A large swelling is much more likely to be neoplastic than inflammatory especially if it is more or less localised The diffuse swelling of acute rapidly spreading inflammation has all the characteristic features of the condition and is unlikely to be mistaken for a neoplasm

Shape The inflammatory swellings are more likely to be flattish and somewhat ill-defined whereas the neoplasms are likely to project and to appear much more localised and well defined The neoplastic swellings are more likely to be nodular or lobulated than the inflammatory ones

Situation As has been mentioned, in young patients both inflammatory and neoplastic conditions start in the metaphysis and therefore, are closely related to the joints, though not in them, whereas in adults disease of the long bones has no preference for the metaphyseal region and tends to be away from it towards the centre of the shaft

Similarly, in relation to the epiphysis it must be kept in mind that primary disease rarely begins there, and although a focus may look as if it were situated in the epiphysis the probabilities are strongly against it except by extension

Skin The first thing usually noted is evidence of increased blood supply The diffuse redness and hyperaemia seen in a superficial inflammatory condition calls for no comment but the enlarged superficial veins indicative of deep increased vascularity is common both to inflammatory and neoplastic conditions In the latter it is more likely to be present with malignant than simple tumours especially sarcomata Oedema of the skin over the swelling is much more likely to be present in inflammation than tumours whereas stretched shiny skin is much more likely to be present in rapidly increasing tumours except in the

early stages of acute inflammation In the case of tumours however, there is none of the associated signs of inflammation as a rule

Sinuses Sinuses are much more commonly seen in inflammatory than in neoplastic conditions, and they usually appear at the site of the most prominent part of the swelling This is not always so, as pus may track to some distance away along the path of least resistance before it reaches the surface One might say that while sinuses are usually over the swelling in inflammatory conditions they may or may not be, while in neoplasms they invariably are While there may be considerable even great diffuse swelling in acute inflammation sinus formation occurs most rapidly with it and as a rule there is a single sinus

In chronic pyogenic cases the swelling is likely to be very considerable and the sinuses multiple

In tuberculous disease the striking feature usually is the appearance of sinuses before the swelling has attained much size indeed one may say that it is least with tuberculosis The sinuses are likely to be multiple

In syphilis sinus formation is much less common When it does occur there is usually a moderate amount of swelling present The sinuses may be single or multiple

In neoplasms sinuses occur only very late in the disease and swelling is the greatest of all with them In sarcoma the skin is likely to be destroyed by pressure underneath and a single often big, opening appears through which the growth may fungate In carcinoma the skin is destroyed by infiltration and when it breaks the sore is part of the growth Discharging sores or sinuses are likely to be multiple in these cases

The discharge in the inflammatory cases is purulent, thick pus in the acute ones sero-pus in the chronic ones often with the specific organisms In neoplasms the discharge while partly produced by the secondary infection present is likely to contain a good deal of blood also from the growth itself especially

Wasting of Muscles This is due to disuse and the greater the pain the less the limb is used It is usually much less than in cases of joint involvement, where the incapacity is relatively much greater

PALPATION

Evidences of inflammation must be first sought and as usual, the greatest gentleness must be used The appreciation of increased heat requires the application of no pressure and should be possible of achievement without producing any pain at all The heat however, may be increased from any excessive vascularity and is not limited to the inflammatory foci Tenderness must also be elicited with the greatest gentleness as here the essence of the test is the production of pain by pressure While it is one of the commonest accompaniments of inflammation and is due to the tension of the inflammatory exudate it may also be present in the

Relations Bone It is usually easy to determine that the swelling belongs to the bone, from its fixity to it and inseparability from it In addition the affected portion of bone does not pass abruptly into normal bone except in such conditions as exostosis or giant celled tumour, but there is a gradual shelving of the swelling to the normal Any infiltrating process, whether inflammatory or malignant, produces this, and even where a sarcoma may present most of its swelling in the soft tissues the under lying bone will show a considerable extent of thickening and swelling

Relations Joints The joint may be overlain by the growth and yet not be involved in it Limitation of movement may result purely from mechanical extra articular swelling but in such a case the range of move ment that is left is free In other words if the joint be invaded by growth limitation results, but there is difficulty with any movement as a rule whereas if the growth be still extra or peri articular, there may be free movement through a limited arc

Other structures such as the vessels nerves muscles and tendons may be infiltrated displaced or surrounded if they are especially rigidly placed

Inflammatory conditions especially the acute ones during their active extension infiltrate the surrounding structures or envelope them if they have a firm resistant covering They do not tend to displace them Neo-plastic conditions on the other hand being chiefly sarcomata, frequently appear to grow so rapidly that they either displace the tissues if they are mobile or grow round them if they are rigid and fixed It is the common finding for a rapidly growing sarcoma to present gross lobulations and grooves between them from tendons and nerves etc Indeed it is often these resistant structures which determine the lobulation Where a muscle has a broad muscular attachment to a bone a malignant growth coming through the bone at that spot is likely to infiltrate directly into the muscle tissue

Measurements It is customary to employ circumferential and longi tudinal measurements as information may be obtained from both

At the level of the swelling the circumference of the limb is measured and compared with the opposite side to indicate the size of the swelling The limb is also measured proximal to the swelling for muscle wasting This is usually better shown proximal than distal to the disease

Longitudinal measurement is more likely to show shortening than lengthening of the affected bone Shortening may be due to destruc tion of a portion of the bone or of the epiphyseal cartilage or it may follow early union of the epiphysis Acute pyogenic infections if they do involve the epiphyseal cartilage are likely to destroy it in part or wholly The result is irregular growth with deformity of the bone or complete arrest of growth with shortening if the bone is single or again deformity if it is one of two bones

Tuberculosis often leads to perforation of the epiphyseal cartilage without doing enough damage to alter its growth or produce early ossification

Syphilis neither destroys it totally nor perforates it but sufficient damage may take place to lead to its early ossification with shortening and dwarfing Among the neoplasms the simple ones, such as the giant celled tumour expand it by pressure but do not as a rule destroy it at all The malignant ones may destroy it by infiltration

In a few cases actual lengthening may be recorded rarely due to inflammation which is more likely to lead to shortening, or to such a condition as diffuse neurofibromatosis in a limb with elephantiasis or an arterio venous fistula

SPECIAL EXAMINATION

Radiology

Radiological examination of bones is an essential part of the investigation of their diseases and an enormous amount of information may be obtained

Situation of Changes The epiphysis the metaphysis and the shaft all come under examination The epiphysis is not commonly involved but it may be in tuberculosis and infiltrating tumours In young patients disease of all sorts is likely to start in the metaphysis and may involve the rest of the bone from there It is almost always endosteal in its origin

In adults the tendency to select the metaphysis is no longer present, and changes are therefore more usually seen away from it i e in the shaft The tendency now is for the subperiosteal region to be affected first and most and not the endosteal Frequently both endosteal and subperiosteal portions of the bone are involved but the former in young patients and the latter in adults is likely to be maximal

Increased density (sclerosis) or *rarefaction* (destruction caries) are the two chief features looked for and whether if present they are localised or diffuse In inflammatory conditions sclerosis represents their second termination and rarefaction the third It may be necessary to compare the affected bone with an adjacent one or the corresponding one of the opposite limb With disuse rarefaction occurs, but it is usually diffuse and the texture of the bone remains unaltered It may be limited to one limb A localised change is strongly suggestive of pathology

Acute pyogenic infections of bone are likely to become diffuse rapidly and the ultimate changes will be equally widely spread e g , in chronic pyogenic osteitis In tuberculosis it is likely to remain localised indefinitely although in some cases it may slowly extend into and involve the shaft by continuity In syphilis the bone is often diffusely affected from the start In neoplasms diffuse changes are rare though they may occasionally occur in sarcoma

In acute pyogenic osteitis extensive necrosis of bone is likely, followed by sequestrum formation and the production of an involucrum to replace the destroyed bone

In chronic pyogenic osteitis we may get the most extensive sclerosis that we meet In tuberculosis sclerosis is minimal and rarefaction and caries are the rule, often multiple foci closely associated Should secondary pyogenic infection occur, some surrounding sclerosis is likely to develop

In syphilis diffuse sclerosis is the rule, though areas of rarefaction may be seen in the more virulent cases, these foci being surrounded by sclerosis

In the neoplasms those which are not osteogenic usually produce destruction and rarefaction either by pressure in the simple tumours or by infiltration in the malignant ones In the osteogenic tumours the amount of bone produced may be large and, therefore, increased density of the bone picture may be marked Secondary malignant deposits in bone usually produce pure destruction with rarefaction often of an irregular rather moth eaten appearance but in very chronic types sclerosis of the affected parts may occur, e g in carcinoma of the prostate frequently in that of the breast much less often

Evidence of New Bone Formation This varies a great deal in the different conditions both inflammatory and neoplastic In chronic pyogenic osteitis we see the maximal formation of new bone in inflammation It is usually also very considerable in syphilis but is minimal in tuberculosis indeed the striking feature of the tuberculous picture is the remarkably small amount of new bone laid down

In the neoplasms it is chiefly a question as to whether they are osteogenic or not Where they are osteogenic we usually find much more bone formation in older patients than young ones and the growths in the adults are sub periosteal as compared with the endosteal ones of young patients and therefore usually produce a much more prominent bony swelling When a tumour comes out through the bone and lifts up the periosteum in so doing there is usually a small amount of new bone laid down under the edge of the raised periosteum for a varying distance This is not necessarily neoplastic

Evidence of Perforation of Bony Substance into surrounding Soft Parts A pyogenic (Brodie s) abscess in perforating does so through a single round punched out opening The activity of the focus which leads to this is likely to give rise to pain and tenderness and perhaps even superficial inflammation and oedema and the radiograph will show the development of a thin layer of new bone on the surface of the old swelling

A tuberculous focus perforates as a rule by multiple apertures and these are ill defined in fact they show the same ragged and undermined edges that are seen in tuberculous ulcers

In neoplasms the simple ones, such as the giant celled tumour, expand the bone and gradually destroy it by pressure It is likely to perforate at more than one site, but it extends slowly into the soft tissues In the rapidly growing sarcomata, the bone is destroyed by infiltration as well as pressure and perforation occurs at several sites through ill defined openings In the former the general outline of the thinned out bone is clear and well defined, in the latter the bone is irregularly destroyed and presents little or no definition Once perforation has occurred, the results differ In a Brodie s abscess a superficial abscess now forms and opens on the surface through a single aperture the picture being that of acute inflammation

In tuberculosis multiple abscesses are likely to form in the soft tissues and these discharge through multiple apertures the process being the typical chronic inflammatory one of tubercle

In the neoplasms growth proceeds into the soft tissues, slowly in the giant-celled tumour rapidly in the ordinary sarcoma Breaking down on the surface will be late if it occurs at all by pressure from underneath the skin This will be followed by fungation of the growth

Investigation of Sinuses When sinuses are present information as to their extent and relations is only likely to be obtained radiologically after injection of radio opaque substances like B I P P or lipiodol At least two views are necessary (Figs 202 221)



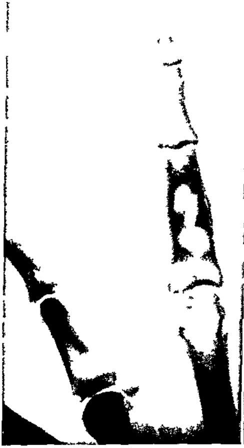
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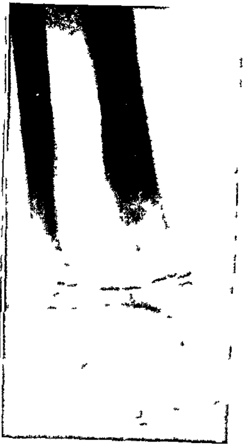
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Fig 202 X ray photograph Acute pyogenic osteitis of femur showing commencement of formation of involucrum

Fig 203 X ray photograph Acute pyogenic osteitis of fibula showing whole shaft as sequestrum with involucrum



204



205

Fig 204 X ray photograph Chronic pyogenic osteitis of first phalanx of index with a typical Brodie s abscess

Fig 205 X ray photograph *Early* tuberculous focus of lower end of radius encroaching on epiphyseal cartilage Note ill definition pure osteo lysis with no sclerosis and scarcely any new bone laid down



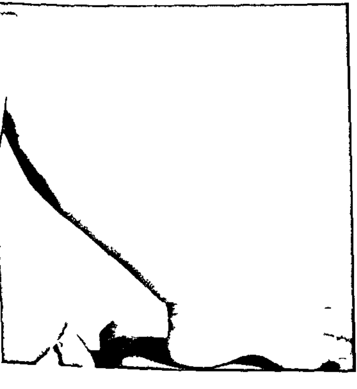
Fig 206 X ray photograph Tuberculous focus of upper end of tibia typically perforating the epiphyseal cartilage into the epiphysis Focus surrounded by zone of sclerosis characteristic of secondary pyogenic infection



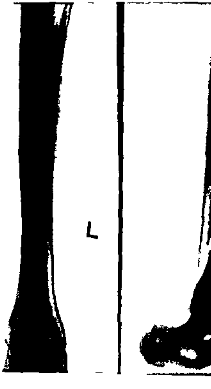
Fig 207 X ray photographs Typical diffuse syphilitic osteitis of children with sclerosis

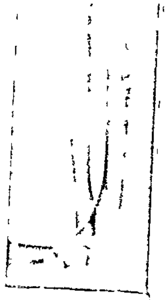
Fig 208 *a* and *b* Photograph and X ray photograph Typical localised syphilitic osteitis of adults middle of shaft with sclerosis

208a

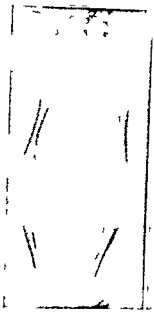


208b





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211

Fig 209 X ray photograph Typical diffuse syphilitic osteitis of children with rarefaction Multiple small rarefied areas not common

Fig 210 X ray photograph Typical localised syphilitic osteitis of children involving metaphysis with both rarefaction and sclerosis Bilateral lesion common in children

Fig 211 X ray photographs Simple cyst of humerus with spontaneous fracture



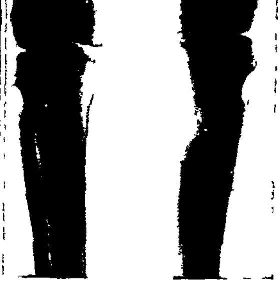
Fig 212 *a* and *b* Two views of a case of advanced hydatid disease of the tibia with a spontaneous fracture Typical



Fig 213*a* Typical hook like exostosis of metaphysis



213b



214a

Fig 213*b* Large cancellous exostosis of femur

Fig 214 *a* and *b* X ray photographs (*a*) Osteoclastoma of tibia, with little expansion of bone (*b*) Osteo-clastoma of tibia with marked expansion of bone

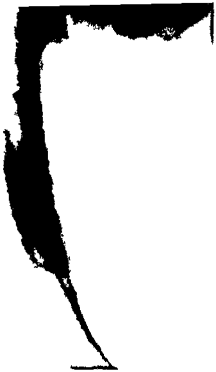
Fig 215 X ray photograph Advanced osteoclastoma of humerus Gross expansion of bone and extension into soft *tissues Considered malignant.*



214b



215



216a



216b



217a

Fig 216 *a* and *b* X ray photographs Paget s disease of (*a*) femur and (*b*) tibia

Fig 217 *a* and *b* X ray photographs Endotheliomata of multiple bones (malignant)



217b



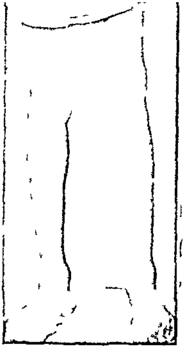
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219

Fig 218 X ray photograph Osteo sarcoma of humerus Relatively begin

Fig 219 X ray photograph Non osteogenic sarcoma of phalanx A true periosteal sarcoma



220a



220b

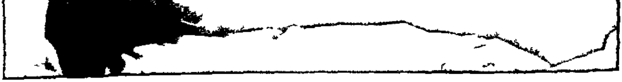
Fig 220 a and b Photograph and X ray photograph Osteogenic sarcoma of femur—virulent so called periosteal type

Fig 221 a and b Photograph and X ray photograph Same case as Fig 220 5½ months later after refusing amputation



221a

221b



DISEASES OF JOINTS SPECIAL FEATURES

HISTORY PRESENT CONDITION

Duration

This necessarily varies greatly whether the condition is an acute or a chronic one A short history is part of an acute condition but it does not negative the possibility of a chronic one Indeed a chronic affection may produce so little of subjective importance that it may be present a long time before the patient notices it

Cause Attributed by Patient

Injury as usual is likely to loom very prominently in the mind of the patient and it may or may not be of importance Where it is immediately followed by disability it is fairly certainly causative but if a long interval separates the injury and the joint condition the story must be accepted with reserve The twist which is so regularly associated with the onset of an attack due to a ruptured medial meniscus is likely to be told of by the patient without any prompting He regards it as part of the attack

Pain

This as usual is due to tension the greater the tension and the more quickly it is produced the greater the pain It must be borne in mind, however that in Charcot s joints where destruction may be of the grossest no pain at all may be felt due to the associated condition of locomotor ataxy with resultant sensory loss

Sudden or Gradual Onset This has a direct bearing on the question of traumatic and inflammatory conditions In the twists and displacements of loose bodies or ruptured cartilages the essence of the attack is the suddenness of it On the other hand inflammatory conditions usually start below their worst and gradually work up to a maximum

Severity The acute conditions whether traumatic like severe wrenches or the sudden stretching of ligaments by displacement of loose bodies engaging between the joint surfaces or inflammatory as in the acute pyogenic infections give the greatest pain and it may be extreme On the other hand chronic inflammatory conditions e g tuberculosis rarely give rise to great pain and syphilis is often

diagnosed from the complete absence of it The pain of acute arthritis by comparison, is so extreme that quite often the patient cannot tolerate anyone walking across the floor, the vibration being sufficient to make it intolerable

The pain of a loose body attack is sometimes so severe as to produce shock and collapse the patient having a grey, knocked out appearance and sweating profusely

Character The usual pain is a continuous aching of varied severity from the persistent increased tension Like other serous cavities the pain of irritation may give rise to severe lancinating attacks produced in the joints by movements—in the chest the movements producing it are from the lung, and in the abdomen the peristalsis of the gut or respiration

There is a special type of lancinating pain known as night starts This occurs in the second stage of arthritis, whether it is acute or chronic In this stage the patient has still voluntary control of the joint while he is awake, but the stronger flexor muscles are beginning to exert their superiority and as soon as he dozes off they give a contraction, which immediately increases the tension in the joint, and he wakes up with an outcry especially if he is a child This feature is of special significance in that it indicates that the joint condition is becoming advanced, and it is usually coincident with the erosion of the articular cartilages

Day or Night This is of special importance in joint disease, as it gives evidence as to the involvement of the bone or not and especially whether the condition began in the bone or not In arthritis, the infection is liable to start either in the bone or in the synovial membrane If it starts in the synovial membrane it is the same as soft tissue inflammation starting mildly increasing with varying speed and severity but not specially worse at night If on the other hand the primary focus is in bone the pain of a corresponding inflammation is likely to be more severe but, in addition it is worse at night and interferes with the patient s sleep The younger the patient the more likely is the infection to start in the bone and the older the greater likelihood of its starting in the synovial membrane Consequently children are more likely to complain of night pain in joint disease than adults especially at the beginning

If the disease commences in the synovial membrane especially if it be a chronic process like tuberculosis the first thing noticed is probably limping There is no complaint at all while the joint is at rest and only sufficient pain or discomfort to cause a limp while walking The muscular contractions and resulting alterations of position lead to the increased tension in the joint and its components which gives rise to discomfort or pain and so to the limp The limp is really an attempt to prevent free movement of the joint and so to prevent the development of pain Indeed the child may be brought entirely because of the limp and not because of pain at all

The night pain of a bone focus is not at all the same as that of the night starts It is the typical aching boring bone pain, varying in its severity with the acuteness or otherwise of the inflammation present

Relation to Exercise This varies markedly with the condition present In loose bodies and ruptured meniscus exercise and movement are essential for the production of an attack Especially in ruptured medial meniscus, the nature of the movement necessary for an attack is important particularly with regard to prognosis As it gets looser, it requires less movement to displace it and the limit is about reached when in turning the foot over in bed medially with the bedclothes preventing it going the cartilage is displaced Operation is imperative by this time To avoid displacement the patient has to keep the foot inverted anything pushing the toe laterally leading to an attack

In osteoarthritis the mildest inflammatory condition we see in joints as a rule pain and stiffness are noticeable when he starts to move the joint and they are relieved by exercise Should fringes and loose bodies be formed the clinical picture may closely simulate that of ruptured meniscus except for the pain and stiffness in the morning improving as the day goes on preceding the ? meniscus attacks

In synovial membrane involvement, e g , tuberculosis, pain is likely to come on after exercise but it is a continuous aching varying in severity with the acuteness of the inflammation

When bone involvement is the primary condition e g , in tuberculosis exercise is unlikely to have any effect on the pain which is mainly at night

RIGOR

This only occurs with infection and only with the acute infections e g. pneumococcus streptococcus and staphylococcus It corresponds to the rigor of acute infections elsewhere

FEVER

This also occurs with infection and conforms to the type of infection and the stage of the pathology The patient is unlikely to notice it unless it is marked and therefore in chronic infections like tuberculosis, as a rule there is no story of fever

LOCKING

This may occur during any movement of a joint and is due to some thing mechanically blocking it The term is not applied to simple limitation of movement but refers to a sudden block at a particular point in a special movement In the knee e g it may occur during flexion during extension or during both In the elbow it is usually during flexion in the temporo mandibular joint during mastication The usual cause is a loose body of any sort in the joint

The knee joint is by far the commonest to be involved, and the commonest cause is a ruptured medial meniscus If the ruptured part blocks the joint in front the patient is unable to extend the knee fully and locking occurs therefore, in the position of flexion He is able to flex more but he cannot extend beyond the angle of locking When the rupture is posterior and the loose part blocks the joint at the back exactly the reverse occurs and the joint now is locked in the position of extension, and the patient is unable to flex his joint In a bucket handle rupture with displacement the joint blocks in both directions

Swelling

Swelling of a joint may be due to that of the structures comprising it or to increase in the amount of fluid in the joint cavity In the great majority of cases both are due to injury or inflammation In cases of injury the swelling is likely to occur at the time i e immediately and it may be due to displacement (dislocation) or haemorrhage If it only appears some hours later, it is usually due to inflammatory exudate, the so called 'traumatic synovitis '

In inflammation it represents the exudate which, in tissue inflam mation would be in the tissue spaces It may be serous sero purulent or frankly purulent according to the pathology In many cases how ever especially chronic cases like tuberculosis, there may be little or no fluid exudate and the whole of the swelling is the result of the inflam mation in the tissues especially the synovial membrane

Whatever the cause swelling of a joint leads to the obliteration of the joint outline and this is especially found in the filling out of any spaces ordinarily seen in connection with the joints In the knee-joint the fossa on either side of the patella is filled out and the sub crureal pouch becomes full and distended In the elbow, the fossa on either side of the olecranon is filled out while in the ankle that on either side of the tendo Achillis is obliterated and there is often also a bulge anteriorly in front of the joint The obliteration of the joint outline indicates definite trouble in the joint and it is of first rate importance in relation to patho logy in the neighbourhood

Occasionally so-called spontaneous swelling may occur in a joint The term is used in the same way as in spontaneous fracture and means that swelling will follow from ordinarily inadequate causes e g minor traumata Such an event is very strongly in favour of the possibility of haemophilia and demands investigation along those lines

Loss of Power

This is a particularly common subjective symptom when there is any trouble in a joint Especially is it seen in the lower limb where the joints have to take the body weight Anything wrong with the joint produces

a strange feeling of lack of confidence in it, instability and weakness apart altogether from pain. The patient will not take the weight on it as he feels it will give way under him. In mechanical conditions so often associated with attacks of displacement and of locking, unless complete reposition takes place the lack of confidence will remain. If, however, a ruptured meniscus is completely reduced, confidence is immediately restored and full use of the joint is likely. Later when osteoarthritic changes had taken place the confidence may take some time to return.

PREVIOUS HISTORY

Illnesses. *In joint infections there is often a primary focus and if so a* history of it may be obtainable, e.g. gonorrhoea, pneumonia, typhoid and pyaemia in the acute cases, other foci in tuberculosis. On the other hand the infection may be primary in the joint and no previous relevant history *of importance will be obtained.*

In gonococcal cases it is often a single joint which is involved and a big one. In pneumonia the joints are usually multiple and not limited to the large ones. In typhoid it is also often a single joint and a characteristic feature of it often is the destruction of the joint with dislocation and without any suppuration. In pyaemia the primary focus will usually be obvious. Multiple joints are likely to be affected.

In tuberculosis one often finds that in a particular case the organisms have a preference for a certain tissue, e.g. skin, glands, bones and joints. In these cases therefore there is often a story of other joints or bones having been affected previously. In neoplastic conditions, which are rare, there is no previous history.

In traumatic conditions the previous history is not likely to be of value.

In the spontaneous haemorrhages of haemophilia, there is nearly always a story of repeated previous haemorrhages, not necessarily limited to the joints.

Previous Attacks. In most of the cases of mechanical attacks due to loose bodies of one sort or another there is a history of previous attacks identical with the present one. At first the patient is completely free of symptoms between the attacks but as time goes on and osteo arthritic changes commence to appear this complete relief is not necessarily obtained and in addition there is often aching and disability apart from the attacks themselves. A story of this type will help very much in elucidating the detail of the condition present.

Causation of Previous Attacks. In these mechanical conditions the causation of the separate attacks is usually identical, i.e. the same movement is responsible each time although as time goes on displacement may become more easily produced. In the knee, e.g., with a ruptured medial meniscus the movement is one of lateral movement of the foot



Fig 222 Acute gonococcal arthritis of the right knee Marked peri articular thickening



Fig 223 X ray photograph Chronic gonococcal arthritis of the knee Note typical stepping at the edge of the joint surface

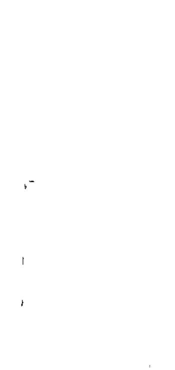


Fig 224 X ray photograph Acute pyogenic arthritis of the knee with gross destruction of apposed joint surfaces

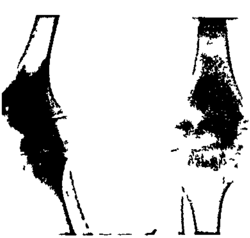


Fig 225 X ray photograph Acute pyogenic arthritis of the knee with a large sequestrum of the femoral condyle



Fig 226 X ray photograph Acute pyogenic arthritis of the left hip joint with bony ankylosis following complete destruction and dislocation of the joint



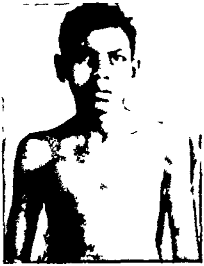


Fig 227 Secondary syphilitic synovitis (Clutton's joints) bilateral and painless Minimal thickening of synovial membrane

Fig 228 Tertiary syphilitic synovitis diffuse gummatous involvement of synovial membrane Unilateral Gross thickening of synovial membrane

Fig 229 Haemorrhage into the shoulder joint A case of haemophilia





Fig 230 X ray photograph Old haemophilic knee joint Gross osteo arthritis with production of box joint

Fig 231 X ray photograph Tuberculous disease of the right hip joint first stage Focus in neck of femur

with the knee fixed or medial movement of the knee with the foot fixed These are really the same movement The limit is reached, as mentioned above, when an attack is precipitated as the patient turns in bed and the clothes impede the medial rotation of the foot, while the knee continues to rotate inwards

Condition between Attacks This has been referred to above In the purely mechanical attacks relief is complete between them till osteo arthritic changes occur Where inflammation is present relief is always slow, compared with the sudden relief from a mechanical reposition (Figs 222 230)

PHYSICAL EXAMINATION GENERAL

The only special point in the general examination is the endeavour to find a focus of disease in cases of infective arthritis, or the underlying cause of a condition of osteo arthritis A peptic focus e g in the teeth, tonsils skin and urethra, may be very important or other evidences of tuberculosis or syphilis

The general condition of inflammatory fever, which may be associated, differs in no way from that usually seen in these circumstances

PHYSICAL EXAMINATION LOCAL

As usual both sides must be compared The same applies here as else where, that what constitutes the normal conformity in some individuals would be regarded in others as grossly abnormal

Inspection

A limp or peculiarities of gait apply to the lower limb and can often be observed as the patient approaches The limp varies with the joint involved and is frequently characteristic of that joint varying with the stage of the pathology

Position of the Joint In progressive infection and inflammation of joints whether acute or chronic, three clinical stages are recognized which result in positions having a common basis, but with individual peculiarities In the acute infections the stages are likely to develop more rapidly than in the chronic ones e g tuberculosis The basic positions are as follows

1 *The position of ease* In this position the capacity of the joint is maximal and tension is therefore relieved as far as possible It is one of semi flexion and the joint is voluntarily fixed in that position

2 *The position controlled by the strongest muscles* These are the flexors and while the patient is able to exert some control while he is awake, this is lost in sleep The occurrence of night starts is characteristic of this stage The position is one of increased flexion and the fixation is involuntary incomplete at first complete later



Fig 232. X ray photograph Tuberculous disease of the left hip joint, second stage



Fig 233 X ray photograph Tuberculous disease of the right hip joint third stage

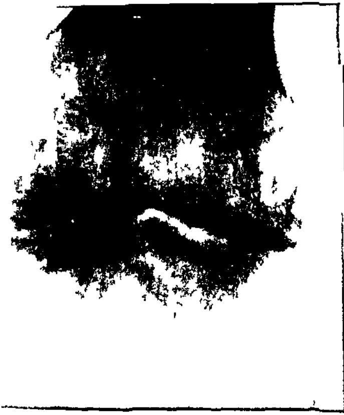


Fig 234 X ray photograph Gross osteo arthritis of the knee joint with marked lipping and osteophyte production Pain minimal

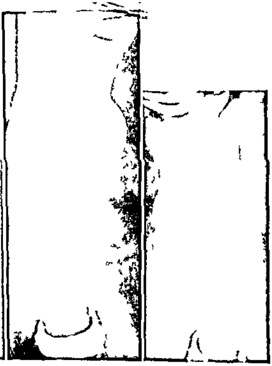


Fig 235 Gross osteo arthritis of the knee joint with Baker s cyst

3 *The position resulting from destruction of the joint* The deformity produced depends on the pull of the strongest muscles, chiefly, and is involuntary It is special for each joint but flexion of an exaggerated degree is the outstanding feature (Figs 231 233)

In the case of mechanical disturbances, e g , the knee in attacks due to loose bodies, the position will vary with that in which the joint is locked by the loose body

Deformity The term deformity is not usually meant to include the simple swelling of a joint but is limited to those cases in which the alignment of the bones taking part in it is abnormal for that position of the joint which is presented It, therefore, presupposes destruction of one or all of the components of the joint, permitting of its displacement, which covers the various degrees of dislocation

In injury such displacements will depend on the direction of the force applied in inflammatory conditions they depend on the contraction of the strongest muscles In the hip the head of the femur is displaced on to the dorsum ilii and the deformity is one of marked flexion adduction medial rotation and shortening

In the knee the head of the tibia is pulled back into the popliteal space and the deformity is one of marked flexion lateral rotation and backward displacement

In the shoulder the head of the humerus is displaced forwards by the pectorals chiefly, and adduction is marked

Swelling Swelling of the joint as already described is indicated by the obliteration of the joint outline and may be due either to fluid or to swelling of the component parts of the joint, especially the synovial membrance

Signs of Inflammation Redness or Enlarged Veins Redness is not obvious where the joints are situated deeply but in these cases large superficial veins indicate deep inflammation Redness is more likely to be present in those cases where the inflammation involves the peri articular as well as the intra articular structures This is perhaps best seen in acute gonococcal arthritis where the peri articular inflammation plays a prominent part

Involving large superficial joints like the knee ankle wrist or elbow the superficial evidences of inflammation are often so marked that they have given rise to the description of a gonorrhoeal arthritis as looking as though it was always going to suppurate and never does

In chronic inflammation of joints especially tuberculosis and more particularly where it affects the synovial membrane of a superficial joint like the knee as opposed to the redness of acute inflammation surface pallor may be sufficiently marked to justify the clinical description of the condition as tumor albus It is produced by the swollen deep structures pressing out the normal surface vascularity

Sinuses The presence of sinus formation suggests either that it may be the cause of the joint condition i e, a penetrating wound, or the stage of the lesion is a very late one

If glairy synovial fluid is present in the discharge it means that the synovial lining is not entirely destroyed Once the lining is entirely destroyed the discharge will be simply sero pus or pure pus, according to the type of infection viz acute pyogenic tuberculous etc

Where the sinuses follow the extension of the joint disease they are usually characteristically placed for the different joints—in the hip either in front or behind the trochanter in the knee, usually from the back of the joint though possibly on either side of the patellar ligament in the ankle behind or in front of either malleolus in the shoulder at the front or back of the deltoid in the elbow on either side of the olecranon in the wrist on the back or front In the smaller joints the sinus is usually over the joint in the fingers dorsally

Wasting of Muscles controlling the Joint This is usually obvious at an early date and the degree of it is much greater than is observed in the case of bone involvement alone In disease limited to bone the joint function is interfered with very little or not at all

Extent of Voluntary Movements In joint disease all the voluntary movements are affected and restricted to a degree varying with the acuteness or chronicity of the condition In the mechanical conditions e g due to loose bodies the joint movements are not affected except during the attack

Where juxta articular structures are involved restriction of the joint movements will be limited to those affected by the involved structures i e specific movements are interfered with instead of all of them where the joint is inflamed or otherwise diseased This is excellently seen in the hip movements If the joint be diseased all movements are restricted if on the other hand infection and inflammation affect the ilio psoas muscle alone the only movement restricted is extension

Abnormal Movements Abnormal movements imply disorganisation of the joint but in most cases this is the result of advanced disease and the patient is unable to demonstrate the abnormal movements voluntarily On the other hand in a case such as Charcot s joints where the patient is likely to be suffering from locomotor ataxy and sensory loss, the abnormal movements can be readily shown by the patient, as they are quite painless

Palpation

Heat As usual the first thing to do is to examine for increased heat the usual indication of active inflammation It is often present when no redness exists and it varies with the acuteness of the inflammation In keeping with what has been emphasized before, the utmost gentleness must be used

Tenderness if any Again the gentleness of the pressure must be of the utmost, as the essence of the test is the production of pain by pressure, and one wishes to give as little as possible Not only is the degree of tenderness the gauge of the acuteness of the inflammation but its localisation is of the greatest importance in indicating the site of chief trouble, and often of the most advanced disease As mentioned previously it serves to separate intra articular conditions from those outside the joint

A good example of this is seen in the first twist that is likely to lead to a ruptured medial meniscus On this occasion the meniscus is frequently untouched and the damage consists of a tear of some of the anterior fibres of the medial collateral ligament, possibly loosening its attachment to the meniscus The tender spot is not over the meniscus, but is usually just above the joint line over the femoral condyle at the anterior border of the medial collateral ligament

Irregularities of Joint Outline The bony prominences are made out and their relations compared with those of the opposite side Thickenings abnormalities and displacements are noted including synovial thickening outgrowths of bone areas of bone destruction and dislocations partial or complete, e g the head of a bone may be felt in an abnormal situation of so the joint must be dislocated

Fluctuation, indicative of fluid may be present The normal amount of fluid in a joint is not demonstrable by fluctuation When there is not much fluid fluctuation may be obtained by squeezing the fluid into an easily accessible portion of the joint e g in the knee emptying the sub crureal pouch into the lower part of the joint

In the case of the knee joint a special test of the presence of excessive fluid is the patellar tap In the normal joint the patella rests on the femur Where fluid is excessive it is lifted up away from the femur and by short sharp jabs it can be ballotted down on to the femur when it gives a tap

Creaking or grating when the patient moves the joint With the flat of the hand placed over the joint get the patient to move it Crepitus or grating suggests osteo arthritis Where the joint is destroyed by active infection the patient will not move it voluntarily The grating may be confirmed by passive movements or demonstrated by them should the patient fail to move the joint The greatest care must be taken in attempting this as it may produce intense pain and be quite unjustifiable In such a case one must not persist

Extent of Normal Movements In judging the extent of normal movements the patient s own active movements must be tried first as mentioned under Inspection Passive movements may then be tried to confirm the result of the active movements One may get more information from one or the other in different cases The individual movements must be gauged as well as those of the joint as a whole as it may be found that only one or a portion of the movements is affected



Fig 236 *a* *b* and *c* X ray photographs Gross osteo arthritis of the knee joint resembling Charcot s joint due to mal united Pott s fracture



Fig 237 X ray photographs Osteo arthritis of wrist joints of rheumatoid type with gross destruction of bone but no osteophyte formation Much pain



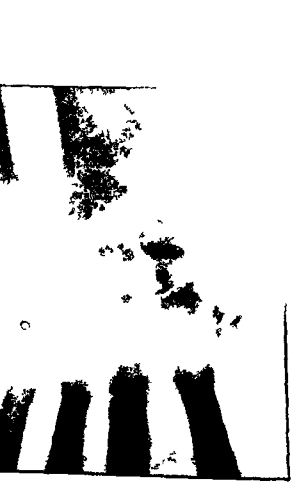
Fig 238 a b and c Photograph and X ray photographs Charcot s knee joint with gross destruction and dislocation and excessive osteophyte formation due to weight bearing

238c





239b 239a



240

Fig 239 *a* and *b* X ray photographs Double Charcot s knee joints The right more recent shows relatively little luxation and minimal osteophyte formation as a result of being laid up and lack of use of the joint

Fig 240 X ray photograph Charcot s wrist joint Pure destruction and no osteophyte production (typical of the upper limb)



238

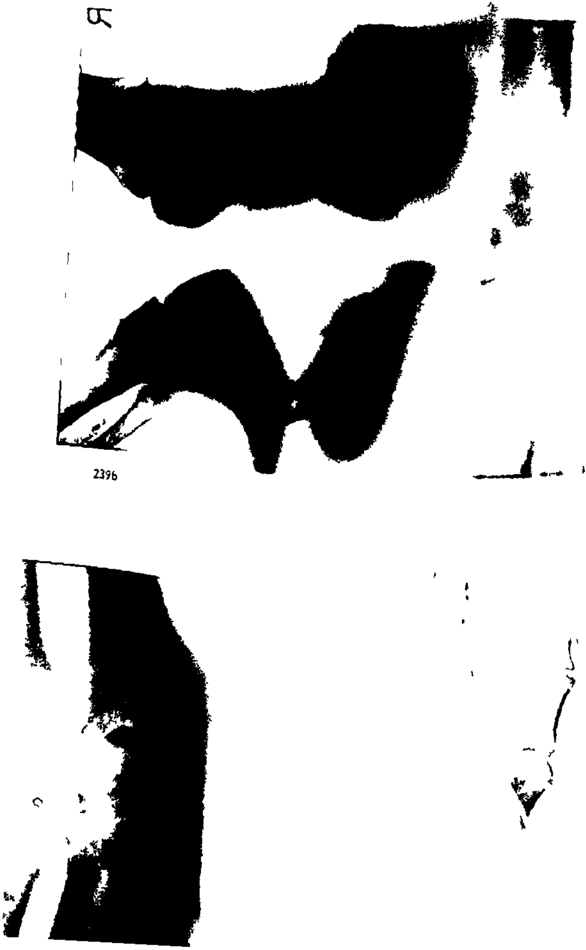
Fig 238 *a b* and *c* Photograph and X ray photographs Charcot s knee joint with gross destruction and dislocation and excessive osteophyte formation (due to weight bearing

238c

238b







2396

Presence of Abnormal Movements This may be confirmatory of what was seen under Inspection but more commonly it is to establish them that the examination is carried out Their presence means that dis organisation of the joint which covers everything from softening and stretching of the ligaments and the capsule to its complete disintegration

Enlargement of Bursae connected with the Joint Sometimes all the demonstrable fluid is in the bursae, e g, in the semi membranosus bursa in those cases where it communicates with the knee joint In such cases it may be possible to empty the bursa into the joint and then demonstrate the fluid in the joint However fluctuation can often be demonstrated between the fluid in the bursa and that in the joint If attention is only drawn to the bursa and it is found to be reducible into the joint it strongly suggests that the primary condition is the joint and not the bursa

Enlargement of the Lymph Glands of Drainage If the glands are enlarged it strongly indicates that the joint condition is an infective one and the type of inflammation in the glands is likely to be the same as in the joint i e acute or chronic as the case may be The glands therefore will help to confirm the joint pathology

Measurements on Both Sides In inflammatory conditions the joint circumference is increased on the affected side but the measurement of the limb proximal to the joint which contains the controlling muscles is diminished often markedly so as muscle wasting is often quite considerable The length of the limb is measured chiefly for shortening as destruction of the component parts of the joint with or without dislocation leads to shortening of the limb It is worth while keeping in mind that in healthy individuals there is quite often a difference of one inch or more in the length of the lower limbs (Figs 234 241)

SPECIAL EXAMINATION

Radiology The information obtained by X ray examination varies very much In early inflammatory conditions nothing abnormal is seen In inflammation with marked exudate into the joint apart from a con firmation of the position of ease the joint surfaces may be separated by the distension For this to occur the ligaments and capsule must be softened and stretched Later destruction of the bony components of the joint becomes evident varying in its extent Displacements will also be seen In the late stages of osteo arthritis the bony changes lipping etc will be evident and frequently the loose bodies associated may be seen Most of these however are likely not to contain bone and are then not visible Bone atrophy from disuse is obvious in any joint disease of some standing but the structure of the bone is not interfered with nor actually destroyed

Aspiration of the Fluid of the Joint This may be a very important



241a



241b

Fig 241 *a* and *b* (*a*) Hypertrophic pulmonary osteo arthropathy of the knee joints in a case of actinomycosis of the lung Photograph presenting the appearance of Clutton's joints (*b*) X ray photographs showing new periosteal bone in all bones in association with the joints

Fig 242 *a* and *b* X ray photographs Two cases illustrating *the saying* that a sprain may be worse than a fracture Both cases treated as sprains show a fracture



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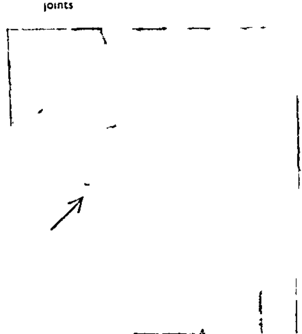
241a



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part of the examination and necessary for diagnosis and treatment, but, like many other types of interference common sense and judgment are essential, as the great majority of cases do not require it and in them there is no indication for it

Exploration of the Joint This may be necessary and should then be carried out and, while one feels that this operation could well be done more often than it is, it should not be undertaken casually but only when *the indication for it is present chiefly, failure to arrive at a conclusion otherwise* (Fig 242)

SCHEME XVII

DISEASES OF THE TONGUE

SPECIAL FEATURES

HISTORY PRESENT CONDITION

Here we mostly deal with conditions of a chronic nature

Duration The duration may or may not be of value While acute conditions such as injury and acute infections necessarily give a short history the shortness of it does not exclude conditions like malignant disease as it may only recently have been observed

On the other hand a very long duration is against malignancy unless the latter has developed on the basis of a chronic condition e g epithelioma on top of a chronic superficial glossitis

Onset Irritation of a tooth is a not infrequent cause of trouble in the tongue It usually starts as an injury with secondary acute infection of the wound but if the tooth be not removed it may become a chronic inflammatory condition On the other hand the tooth irritation may simply draw attention to some condition which has nothing to do with the tooth The commonest site of carcinoma is at the side of the tongue where its increasing growth will bring it up against the teeth In such a case the ulcer would not heal after removal of the tooth and that in itself would give rise to grave suspicion

Is the Tumour or Ulcer Primary? In the acute conditions where as a rule a wound by a tooth or other agent becomes acutely infected, the ulcer appears first and is followed by the swelling due to inflammatory infiltration In the chronic inflammatory conditions tuberculosis may start either as a lump or an ulcer as elsewhere It depends on the virulence of the infection and the termination of the resulting inflammation Where the infection is mild and the second termination is likely to result with fibrous tissue formation the lump is likely to be seen, but in the more acute infections the third termination of inflammation with ulceration is likely to occur This is the commoner clinical condition as tuberculosis of the tongue is nearly always secondary to pulmonary or laryngeal tubercle and the patient is already grossly debilitated before it develops The sites for the ulcers are the frenum and sides of the tongue where abrasion readily occurs and also far back on the dorsum where there may be an accumulation of infected sputum in the fossa between the

part of the examination and necessary for diagnosis and treatment, but, like many other types of interference, common sense and judgment are essential, as the great majority of cases do not require it, and in them there is no indication for it

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248



249

Fig 248 Simple papilloma of the tongue

Fig 249 Simple papilloma of the tongue ulcerated and infected resembling Hutchin son s wart

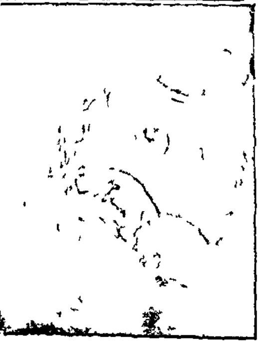
Fig 250 Epithelioma of the tongue in a coloured female—ulcerating tumour type

Fig 251 Epithelioma of the tongue—crater ulcer type Marked chronic superficial glossitis present

Fig 252 Epithelioma of the tongue of tumorating type with marked chronic super ficial glossitis



250



251





243



244



245

Fig. 243 Tuberculous ulcer of the tongue (patient between 80 and 90 years) Very chronic lesion suggested by lumpy development

Fig. 244 Primary chancre of the tongue

Fig. 245 Secondary syphilis snail track ulcer of the tongue and condylomata at the angles of the mouth

Fig. 246 Late secondary syphilide of tongue—Hutchinson's wart

Fig. 247 *a* and *b* Chronic syphilitic superficial glossitis *b* With an epithelioma on the right side



246



247a



247b

be seen in acute ulcers it is *unlikely to be present in any of the chronic* inflammatory ones Carcinomatous ulcers, on the other hand, are much inclined to bleed and often quite considerably An uncommon condition which may bleed very freely if ulcerated, is an angioma, even of the tiniest size

Mobility of the Tongue The tongue may be fixed either because of pain infiltration or oedema *In the superficial ulcers the pain produced* by movement is sufficient to make the patient keep it quiet If the ulcer is anaesthetised mobility is normal

In infiltration whether inflammatory or malignant, the tongue muscles are involved and their function is interfered with Associated pain may increase the limitation caused by the infiltration

Oedema whether due to inflammation and *inflammatory* exudate or due to lymphatic blocking from fibrosis (e g in syphilis) or malignant infiltration is a further cause of loss of mobility The tongue is apt to become swollen and large and loses its pliability

Speech Affected It is usually the fixation of the tongue which interferes with speech and therefore anything that will fix it much or little will alter the speech, *which is usually thick and slurring It is aggravated* by the accumulation of saliva which is likely to follow the interference with the muscle movements and so with deglutition

The size of the tongue itself may have the same effect where it is big enough to fill the mouth It may result from various causes, e g neurofibromatosis and angioma It is also seen in cretinism, but it may have no satisfactory *explanation when instead of simply being called a large* tongue the term macroglossia is applied to it

PREVIOUS HISTORY

There are three conditions of importance in relation to the past history of tongue carcinoma and which constitute the main predisposing causes *of it They are alcoholism smoking and syphilis Of the three alcoholism* and smoking are not so serious if alone but when associated with syphilis they aggravate its manifestations Most carcinomas of the tongue occur in syphilitics It is of a little interest that the first letters of these predisposing factors of carcinoma of the tongue are A S S seeing that the factors themselves are all evidences of folly

PHYSICAL EXAMINATION GENERAL

Apart from the general manifestations of the local lesions the special part of the general examination consists in an attempt to find some cause predisposing or exciting of the tongue condition Such conditions as syphilis tuberculosis pernicious anaemia dyspepsia etc should be considered the pernicious anaemia and dyspepsia *often being* responsible for painful and superficially ulcerated tongues

tongue and epiglottis The tumour formation is more likely on the back of the dorsum of the tongue

In syphilis what we get depends on the stage of the disease The primary sore is a lump which ulcerates The secondary lesions usually commence as white patches of thickened epithelium, followed by superficial ulcers At no time is there a lump In the late secondary stage, the so called tubercular syphilides may appear here resembling the lump in tubercle The swellings usually appear in the mid line of the dorsum of the tongue and ulcerate later They have long been known as Hutchinson s warts In the tertiary stage the usual manifestation is the gumma, which commences as a lump and then this breaks down and ulcerates The lump may remain for 2-3 months before it breaks down It usually occupies the mid line of the tongue In this stage too a most important condition may appear chronic superficial glossitis which is remarkable for its chronicity with gross catarrh and destruction of papillae and epithelium and the possible formation of multiple small fissures and ulcers It is of special interest in that it is the commonest precursor of carcinoma of the tongue

Actinomycosis may be quite chronic and it usually commences as a lump which softens and then ulcerates often with a deep sinus leading into the mass The sinuses may be multiple

An epithelioma may start either as a tumour which ulcerates or as an ulcer which tumorates In either case when it is fully developed there is always more growth than destruction and the patient is more likely to speak of it as a lump (Figs 243 252)

Pain Relation to Food Ingestion and Situation In superficial ulcers there is usually little or no pain if the mouth and the tongue are kept quiet and free from irritation Pain is produced by anything irritating brought into contact with the ulcer and this will be aggravated by movement The pain is of a smarting type characteristic of mucous membranes and is felt locally at the side of the ulcer

In deep infiltrated ulcers there is often a continuous gnawing pain, which is referred to the ear and this is aggravated both by food and movement It is best seen in carcinoma and is responsible for Rutherford Morison s aphorism in a subject past middle age cotton wool in the ear and an ulcer on the tongue suggest cancer The cotton wool is worn in the ear as the patient complains of earache

Discharge Sero purulent or purulent discharge will come from any ulcer depending on the type of infection and the acuteness of the inflammation present

A foetid discharge will appear in any deeply excavated ulcer with the likelihood of retention of material and possible sloughing e g deep gummatous and actinomycotic foci and carcinoma It is not met in the superficial ulcers While a very small amount of bleeding may

are multiple and distributed anywhere on the dorsum and the sides of the tongue and indeed, often affect also the adjacent mucous membrane of the floor of the mouth

Pyogenic ulcers are mostly at the side of the tongue where tooth irritation starts them

Tuberculous ulcers may be at the frenum on the sides or on the dorsum

Syphilitic ulcers—primary, on the tip or dorsum early secondary like snail tracks over the surface anywhere late secondary, mid line of the dorsum superficially gumma in the mid line and deep chronic superficial glossitis anywhere on the dorsum and the sides

Actinomycotic ulcers are usually over the swelling which occupies one side close to the lateral margin, where it is likely to follow an abrasion from a tooth

Carcinomatous ulcers are usually situated on the side of the tongue or frenum but quite a number commence on the dorsum where a superficial glossitis has been present

There is nothing special about the surface of most of the ulcers of the tongue The superficial ones are flattish the tuberculous one may show tubercles Except for the gumma the syphilitic ulcers are flat and superficial while the gumma is deep and punched out The actinomycotic ulcer is more like a sinus with a small aperture and passing deeply The malignant ulcer has usually a grossly irregular surface Discharge is not usually seen in any quantity, as the patient continually removes it by swallowing or expectoration It is more likely to be sanious in neoplastic ulcers

Growth in excess of destruction is the characteristic of the ulcers of carcinomata and they look lumpy and tumour like in spite of the ulceration

Tumour The term covers all localised swellings and it is likely to be either chronic inflammatory or neoplastic Of the chronic inflammatory ones the tuberculous is likely to be at the back of the dorsum of the tongue the gumma forms a lump in the mid line actinomycosis starts as a swelling on one side usually towards the back and the carcinoma is usually either on the side or the frenum Occasionally a piece of thyroid tissue is seen at the back of the tongue in the region of the foramen caecum Sometimes it is the only piece of thyroid the patient possesses and it is therefore imperative not to mistake it for a neoplasm It may look very vascular indeed almost suggestive of an angioma The latter when present is usually seen on the dorsum of the tongue

Mobility of the Tongue Watch the patient trying to move it Its fixity is usually easily appreciated

Condition of the Teeth especially those in relation to the Affected Part They may be carious and jagged if they are responsible for the lesion

PHYSICAL EXAMINATION LOCAL

INSPECTION

Look at the general condition of the mucous membrane From a surgical point of view the most important condition is chronic superficial glossitis a late syphilitic manifestation which is pre cancerous Even where an epithelioma is present the rest of the tongue is likely to show the glossitis with, at this stage its patches of glossiness due to atrophy of the papillae, and small fissures or ulcers

Onyalai while not uncommon up north is rarely seen at the Cape It is a haemorrhagic state associated with a thrombocytopenia of unknown origin and is almost entirely limited to the African native It presents the usual manifestations accompanying purpuric conditions, including haemorrhages from the mucous membranes of the nose, mouth urinary and intestinal tracts and also intracranial haemorrhage but its most characteristic clinical feature is the occurrence of haemorrhagic bullae in the mouth, especially the tongue In the more severe cases there is marked anaemia The mortality is roughly 20 per cent (Gelfand) but in some of the cases that recover there is a tendency to recurrence

The superficial ulcers of dyspeptics, Vincent s angina and geographical tongue are mostly of medical interest though the ulcers of achlorhydria may point to a surgical condition of the stomach e g simple ulcer or carcinoma If an ulcer or a tumour is seen it must be investigated carefully

Ulcer Multiplicity is against carcinoma and in favour of inflammation Singleness does not mean that it is malignant as many others are also single

Size A carcinomatous ulcer may reach any size The gummatous ulcer is likely to be much larger than the small fissures and ulcers of chronic superficial glossitis Most of the non malignant ulcers are not large though a hard chancre may involve a considerable area of the surface

The shape of the ulcer is very variable The gumma becomes rounded and punched out In chronic superficial glossitis the ulcers are small and fissured In tuberculosis the ulcer has the usual appearance of a ragged outline In actinomycosis there are apt to be multiple small sinuses leading into the swelling An ulcer the result of tooth irritation is likely to be somewhat excavated and the tooth fits into it In carcinoma the ulcer is likely to be irregular with a tendency to elongation on the body and the side of the tongue and transverse fissuring at the frenum which latter may be particularly deep

The *situation* varies with the type of ulcer and some of the sites have already been referred to

The superficial ulcers e g peptic Vincent s geographical anaemic

exudate, the consistency is usually firm and inelastic and this includes both acute and chronic inflammations Subsequently, should the termination of the inflammation tend towards fibrosis, the consistency may become harder, but the usual termination in the tongue is the third, viz breaking down and suppuration When this occurs there is a steadily progressive softening in the swelling with fluctuation ultimately, before it opens and discharges This is particularly noticeable in the granulomata whether of tuberculous, syphilitic or actinomycotic origin In carcinoma, on the other hand, the swelling is usually hard and inelastic from the beginning and remains so

The surface of most of the inflammatory swellings is more or less smooth although in the granulomata there is a tendency, during extension for nodularity to develop

In the epithelioma the surface is consistently irregular It may present gross irregularities but the whole of it, in addition, is finely irregular as a result of the infiltration of the surrounding tissue from every part of the periphery of the growth A rare carcinoma of the tongue is the basal celled carcinoma and it usually presents somewhat characteristic features It is a hard flattish inelastic swelling which may cover a fairly large area, but shows little infiltration and little tendency to ulceration the surface being finely irregular and its edge rather resembling that of a rodent ulcer

The edge in all actively extending inflammatory swellings is ill defined from infiltrating exudate It is seen in both acute and chronic cases e g in an actinomycotic focus As the focus begins to recover, the surrounding exudate is the first to disappear and the swelling becomes much more clearly outlined

In epithelioma the edge is usually ill defined and shelving into the surrounding tissues and the more rapidly growing it is, the more extensive the infiltration In the tongue it does not usually attain much size before ulcerating

The simple tumours which are rarities, may be very well defined, but angiomata usually have no definable edge to be felt

Occasionally tooth irritation results in a mucous cyst of the tongue, rather than an ulcer and the small rounded retention cyst will show a sharply or ill defined edge, according to the absence or presence of infection and inflammation and the degree of it With the exception of carcinoma and the more serious cases of actinomycosis, most of the tongue lesions are limited to the immediate neighbourhood of their origin but in carcinoma especially any of the adjacent structures may be involved by extension This is also seen in actinomycosis which has not been controlled

Extension Extension of a focus of disease may occur by any of the usual four routes viz continuity of tissue, contiguity the lymphatics

The whole buccal cavity should be examined, and a spatula is usually necessary, particularly if there is fixity of the tongue, difficulty in opening the mouth, or pain which may impede the patient s efforts to help Evidence of syphilis or other conditions may be seen, e g extension of the tongue condition

Note whether there is any cotton wool in the ear suggesting infiltration and referred pain probably due to carcinoma During an examination speech affection has almost certainly been observed if it is present, and foetor of the breath cannot have escaped notice, suggesting, as it does deeply excavating ulcers and most commonly carcinoma

PALPATION

Ulcer As usual, the surface, edge, base and discharge are to be noted, and of these the surface and discharge have been considered under Inspection '

The superficial ulcers with the exception of the acutely infected ones show no thickening of their edge or infiltration of the surrounding tissue In the acutely infected one during its early stages there may be quite considerable infiltration with thickening and hardening of the edge and the tissue around It rapidly settles as the condition improves

In tuberculosis the edge is ragged and tends to be undermined and there is no infiltration as a rule This is usually a striking feature of tuberculous ulcers, and often gives rather a surprise

In the gumma infiltration is very marked in the early stages but as the ulcer develops the edge becomes typically punched out and the infiltration rapidly diminishes

In the small ulcers of chronic superficial glossitis there is no thickening of the edge at all

In actinomycosis the ulcers are small and penetrating and more in the nature of sinuses The edge of the opening is fairly even but there is marked infiltration and thickening all round it

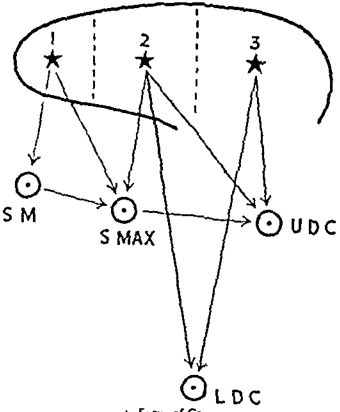
In the epithelioma the appearances are as elsewhere and the edge is usually heaped up may be everted and shows growth in excess of destruction

The base of the different ulcers which is what is felt while the surface is what is seen again reflects the pathology

There is no thickening or infiltration in the superficial ulcers except the early stages of the acutely infected ones and the same applies to the tuberculous ulcer The gumma presents gross infiltration in its early stages while the actinomycotic usually shows a steadily increasing infiltration The epitheliomata are essentially infiltrating and the amount of it there is depends on its duration

Tumour Here again the systematic investigation must be carried out including the consistency surface edge and relations

During the extending stage of inflammatory swellings with increasing



1 Apex and anterior third of the tongue
2 Middle third of the tongue
3 Posterior third of the tongue
S M Submental glands
S MAX Submaxillary glands
U D C Upper deep cervical glands (tonsillar glands)
L D C Lower deep cervical glands (under the omo-hyoid muscle)
Arrows indicate the primary lymph spread and from gland to gland group Retrograde spread may occur and also spread to the opposite side of the neck

Fig 253 Line drawing of lymph drainage of the tongu

Fig 254 Aberrant mass of thyroid tissue on the region of the foramen caecum No other thyroid tissue was dis coverable

Fig 255 Onyalai Typical blood containing vesicles Rarely seen except in natives



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255

and the blood stream In most of the superficial ulcers extension occurs simply by continuity from their edges

In the infective cases, the infection may spread by any of the methods

In the carcinoma of the tongue the spread is almost entirely limited to continuity of tissue and the lymphatics Contiguity may occasionally be seen with opposing surfaces involved, but most of these are really examples of continuity, the intervening tissue being free from growth to the naked eye One has seen a secondary in the stomach wall, apparently by implantation (contiguity) Blood spread is extremely rare though it does occur Continuity spread in carcinoma of the tongue is exceedingly important The tongue itself becomes increasingly involved then the floor of the mouth the mandible, and possibly the cheek A backward extension may involve the pillars of the fauces and this is often attended with much pain on account of their unavoidable use in deglutition, which in these cases may become almost continuous from the increased salivation often present and the retention of the saliva because of the fixity of the tongue

Lymphatic Spread This is a most important method of spread in cancer of the tongue and there are few of them which do not show it The lowest grade epithelioma is not common in the tongue, the great majority belonging to grades 2 and 3 of Broder s classification i e, having from 25 per cent to 75 per cent of undifferentiated cells These are very prone to spread by the lymphatics

In some of the epitheliomas which develop in old cases of chronic superficial glossitis the growth may be strictly confined at first by the fibrous tissue which has been produced and in very old patients the growth tends to be local for some time, and less active

The usual lymph glands involved are the submaxillary and the upper deep cervical but the submental are frequently involved in anterior growths while especially from the posterior two thirds of the tongue there may be direct spread to the lower deep cervical glands viz, the gland lying on the internal jugular under cover of the omohyoid at the level of the cricoid cartilage If the tongue be divided into thirds anterior middle and posterior the gland involvement is usually as follows anterior third submental and submaxillary middle third submaxillary upper deep cervical and lower deep cervical posterior third upper and lower deep cervical In all cases secondary extension may occur from one group of glands to another, and blocking of one avenue of drainage is likely to open up another possibly by retrograde drainage

It is important to remember also, that there is a free communication between the lymphatics of both sides of the tongue and hence the opposite side of the neck is liable to invasion

It will be readily appreciated what the old radical operation for carcinoma of the tongue included in an attempt to excise the local growth

SCHEME XVIII

INJURIES TO THE HEAD SPECIAL FEATURES

This is simply a special type of injury and, while it presents all the features of any injury, it has also special features relative to its situation

HISTORY PRESENT CONDITION

In the more serious cases no history can be obtained from the patient and unless onlookers were present there may be no history at all If a history be obtainable either from onlookers or in the milder cases from the patient there are certain points of special importance

Duration i e since the receipt of the injury This is very important as both diagnosis and treatment may have to be modified in view of the lapse of time

In all injuries we have stipulated three stages (1) the general condition of shock (2) the stage of recovery from shock and (3) the local manifestations especially haemorrhage sepsis and local interference with function

In head injuries not only is shock produced, but there is also immediate disturbance of cerebral function as a result of the blow which may be anything from a slightly dazed condition to unconsciousness The combination of shock and cerebral disturbance is called concussion and it is produced *immediately* by the injury Compared therefore, with other injuries shock is here likely to be complicated by unconsciousness and that is the only modification of importance

In the more serious head injuries there is frequently no second stage and the stage of concussion passes into that of the local manifestations The patient may never regain consciousness and the likelihood is that the continued coma is now due to cerebral compression either from haemorrhage or oedema and it is of the greatest possible consequence to be able to differentiate between the two This is one of the reasons for the extreme importance attached to the duration since the injury Compression does not occur at once though it may develop very quickly and does so more rapidly from haemorrhage than oedema A second reason is in relation to possible sepsis since here the only hope there is of dealing radically with it is if it can be tackled at once otherwise irreparable damage may be done

widely and the whole area of lymph drainage In addition to extensive removal of the tongue for which the lower jaw had to be split both sterno mastoids and internal jugular veins were frequently removed to permit of thorough excision of all the possibly infected glands The results even of such an operation were not good and it was a great relief to everyone when the radiologists began to claim better results so that now they have almost a monopoly of these cases

As a final investigation a snip of affected tissue for microscopic section will clear up many doubts (Figs 254 255)

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Cause The cause in these cases is of great importance, seeing that the results are likely to vary very much according to the agent producing them, e g, a stabbing instrument or a hammer

Nature and Severity of the Injury These are usually inseparably associated with the causal agent, but the force that was employed in using it is also a prominent factor As a rule the more serious the trauma the more serious the clinical results, but this is by no means always a guide

A patient may be involved in a very serious accident and yet escape with little or no damage, while someone next to him may be killed

One may say however that if a patient receives a serious injury the outlook is correspondingly serious but the same does not hold good conversely i e, a relative mild injury may be followed by very serious results A case in point will illustrate this well A miner bumped his head on the roof when rising from his work He did not report it and finished the shift He began to have severe headache the next day and did not return to work He died a few days later, and at autopsy a septic intracranial haematoma was found with diffuse meningitis, but no fracture was present

Unconsciousness The history of unconsciousness may be of the greatest value in assessing what has happened The patient may never have lost consciousness but while this is to be expected in mild injuries it does not exclude a serious one, e g, the case of the miner quoted above On the other hand, in children it is quite common to see a really serious head injury, e g a fractured base of the skull, without loss of consciousness In adults this rarely happens One child had a fracture of the petrous temporal with facial paralysis which lasted for six months but there was never any loss of consciousness If unconsciousness occurred, it is important to know whether it occurred immediately or later Immediate loss of consciousness means concussion, but its later loss means compression more often and more quickly due to haemorrhage than oedema which is associated with contusion of the brain and minor laceration

The duration of the unconsciousness due to concussion usually varies with the severity of the injury but not always so If consciousness was regained it is important to know whether it was temporary or permanent If it was permanent it means recovery from the injury If it was temporary only then it means that recovery took place from the concussion but that compression subsequently developed The interval of consciousness now is a valuable feature, as it is likely to be shorter in those cases where haemorrhage causes the compression than in the cases of oedema This must be appreciated since the prognosis and treatment depend on the decision as to the cause of the compression

Paralysis Is there anything in the story to indicate it? This would only be likely if the patient regained consciousness sufficiently to use his muscles so that he or others could observe it If its presence is con

firmed, it is important to know whether it occurred at once or later If it occurred at once, it suggests direct injury to the corresponding part of the brain at the time, while if it appeared later it suggests interference with that portion of the brain, either from haemorrhage, oedema or in flammation, and the prognosis varies accordingly Immediate destruction of brain tissue is most likely to produce permanent paralysis, while hae morrhage is more likely to do so than oedema, and inflammation depends on the virulence of the infection and the termination of the inflammation as to whether temporary or permanent paralysis is probable

Reflexes These are readily lost in severe head injuries, the super ficial more so than the deep The loss of sphincter control only occurs in the really serious cases, whether of concussion or compression and it is a very bad prognostic sign It is the only reflex loss that is likely to receive notice by the layman and therefore, the only one on which information is likely to be obtained

Wound The story of whether a wound is present or not is again of great importance as sepsis here relates not only to a possible fracture but also to the brain and its coverings Both are likely to be serious, and are naturally more likely to be present if there is an open wound

Haemorrhage on the other hand, is less likely to be serious if there is an open wound than if there is no external exit, when it is more likely to produce compression

Haemorrhage The only haemorrhage of which information is likely to be obtained in the history is that of external haemorrhage coming from an open wound External haemorrhage may be copious coming from a scalp wound but it is rarely sufficient to endanger the patient s life Where the skull is fractured the haemorrhage as from any bone, is likely to be considerable in amount and persistent but again, it is unlikely to do much harm *per se* The persistent nature of the haemor rhage in head injuries is the important feature as it points very strongly to skull fracture e g , in bleeding from the ear, it may occur from the external ear when it is likely to be small in amount and to stop quite quickly If, on the other hand it is from a fractured base it may persist for thirty six hours or more and be strong clinical evidence of the fracture

Relative to haemorrhage though it cannot be part of the history, one might mention here that in cases of internal haemorrhage, so far as head injuries are concerned the patient is much more likely to die of compression than of loss of blood

Other Discharge It is well to get any information that may be avail- able on this point as the ordinary layman is likely to be struck with the escape of cerebral fluid which may be very large in amount or with that of brain tissue which he will probably recognize as a result of his visits to the butcher They both represent very serious conditions and should not be missed if at all possible Unfortunately, in all shocked conditions

the patient is likely to perspire freely, and the loss of fluid may be attributed to this as the face may be covered with beads of perspiration especially on the forehead However, the amount is likely to exceed anything that could be explained by perspiration, and note will probably be made of it by a competent observer The loss of brain tissue is even more serious, as it is irreplaceable They both carry with them the diagnosis of fracture and tearing of the dura into the subarachnoid space or the brain, or both

Sepsis Fouling of the Wound In the early stages of injury there is not yet time for inflammation to be set up and, therefore, the likelihood of sepsis and its degree could only be gauged by the presence of fouling of the wound, and a layman can see that as well as a medical man

PHYSICAL EXAMINATION GENERAL

The most important feature arises here on the question of unconsciousness when it is present as to whether it is due to concussion which is shock combined with cerebral disturbance, or compression, which in the stage when help is likely to be of value, is compensated by intracranial adjustment The following description is that of compensated compression When failure of compensation takes place, the clinical picture changes and the patient is more or less moribund

Fortunately, the clinical pictures of concussion and compensated compression are very different and almost completely opposite in their manifestations The difference will probably be more easily followed if they are put in tabulated form (pages 266 267)

Other reflexes must be examined They may help to localise focal brain damage Their return after a period of absence is a good prognostic point

Examine for the presence of other injuries This is of added importance in those cases where the patient may be unable to draw attention to them and frequently the head injury is only one of several the patient may have sustained

PHYSICAL EXAMINATION LOCAL

Is there a Wound? If there is one its nature and extent must be investigated Whether it is of the incised punctured or contused and lacerated type will depend on the agent producing it and the implications of such a type will go with it here as elsewhere Whether it is clean or fouled is important Its extent will offer a fair gauge as to the damage likely to have been done but the damage may be much greater or less than would appear to be the case

Is there Haemorrhage? If there is determine its origin and characters Bleeding from the nose may be associated with fracture of the anterior

middle or posterior fossa and, except in the anterior fossa it is likely to be swallowed and then vomited

In the anterior fossa it may flow directly from the nose, but some is likely to be swallowed and vomited It may be difficult to differentiate between them on this sign alone The bleeding however, may be from the nose itself, but in this case it is unlikely to persist as in the case of fracture

Bleeding from the ear may arise in fracture of the middle or posterior fossa and here again, its persistence is strongly in favour of its not com ing from the soft tissues of the ear Whether or not there is external haemorrhage but especially if not, evidence of blood extravasation into the tissues may be of great value in diagnosis

In fractures of the anterior fossa haemorrhage is likely to take place into the orbit and to track along the lateral rectus reaching the lateral margin of the cornea It appears as a subconjunctival haemorrhage of triangular shape with its base towards the fornix at the back, and its apex at the corneal margin It takes about 24 48 hours to appear In the case of the ordinary black eye the subconjunctival haemorrhage is likely to be much more diffuse and its widest part is anteriorly at the corneal margin It appears more quickly and is likely to be assoc iated with bruising of the lids

In fractures of the posterior fossa far back, haemorrhage may occur into the muscles at the back of the neck Ecchymosis, may be seen in this region, strongly suggesting the fracture It usually takes three or four days to appear

Haemorrhage into the scalp is likely to be strictly localised, on account of the dense fibrous nature of its subcutaneous tissue In children a sub pericranial haemorrhage, possibly due to a fracture, gives rise to a ceph alhaematoma, and it is usually delimited by the sutures of the bone it is associated with i e it takes the shape as a rule of the frontal or parietal bone the pericranium being fixed at the suture lines In adults such a haemorrhage is likely to be much more limited, on account of the firmer attachment of the pericranium to the bone

Is there other discharge present, e g, cerebro spinal fluid or brain tissue? This observation would be in confirmation of previous informa tion or it might be in spite of lay observations It is most important to decide as both conditions must be regarded as serious indicating the extent of the injury While both may come from an obvious wound with underlying fracture they may both occur e g from the ear, when there is no obvious external wound at all In such a case they help to indicate the site of the fracture Whether these discharges, or others such as blood or pus pulsate or not is also valuable as information If pulsation is present, it indicates that there is a communication with the inside of the skull, and this carries with it the presence of a fracture

	CONCUSSION	COMPRFSSION
FACIAL APPEARANCE	Pale	Red congested or cyanosed
SKIN	Pale cold and sweating	Red hot and dry
RESPIRATIONS	Rapid shallow and quiet Cheyne Stokes breathing may occur in the most serious cases Such patients do not recover consciousness but pass from concussion to compression The outlook is extremely bad and likely to be fatal	Slow laboured and stertorous suggesting snoring If Cheyne Stokes then the prognosis is exceedingly bad
TEMPERATURE	Subnormal	Nearly always elevated If the compression is due to oedema which is likely to accompany cerebral contusion, the temperature is not high rarely over 102° F If it is due to haemorrhage associated with brain laceration the temperature is often up to 103° F If haemorrhage has occurred into the lateral ventricle, the temperature may rise to 105° or 106° F
PULSE	Rapid and small, with low blood pressure	Slows down If fully compensated it may drop to 50 per minute or less It is full and bounding

		with a raised blood pressure If compensation fails, the pulse count *rapidly* rises, but the pressure falls Cerebral *anaemia* occurs and the outlook is more or less hopeless Interference is unlikely now to be of any assistance
Pupils	Small and contracted	Dilated If widely dilated, they are often unequal, the pupil on the side of the haemorrhage dilates first and most *In* the early stages the pupil reacts later it becomes fixed This is of very serious prognostic import If the pupils are unequal especially *if* still reacting the more serious damage is on the *more dilated* side
Muscles	*Flabby* If the patient is deeply unconscious and the reflexes are gone there will be no suggestion of voluntary use	If not deeply comatose the patient may be roused and use his muscles Paralyzed muscles will remain flabby If there is a *zone of irritation*, muscles may be spastic, otherwise they are flaccid
Sphincter Control	This is unlikely to be lost except in the most serious *injuries*, with gross trauma of the brain It is of the most serious possible significance	More likely to be lost than in concussion In *this* case also it must be regarded with the utmost gravity as a large proportion of these patients die

Is there a Swelling? If so its consistency, surface edge and relations must be ascertained as usual, If it occurs early it is almost certainly due to haemorrhage, and its delimitation will depend on its situation whether in the scalp under the aponeurosis of the occipito-frontalis or under the pericranium In the scalp it is strictly localised, under the aponeurosis it may extend widely to its attachments i e, upper curved line of the occipital bone behind, supra orbital ridge in front temporal fossa on either side under the pericranium it is likely to be strictly limited in adults but in children more likely to take the shape of the bone it lies on i e, the cephalhaematoma

It is of particular importance in the sub pericranial haemorrhage as it may be mistaken for a depressed fracture the centre being fluid and easily compressible whereas the edge is formed of clotted blood and may feel quite hard This edge, however unlike bone can be in dented by firm pressure It shelves into the surrounding bone

The same delimitations are seen later if the swelling is due to infec tion and inflammation but the evidences of acute inflammation are present as well

Occasionally an external swelling will pulsate and it indicates as in the case of discharge that there is a communication with the interior of the skull and therefore a fracture is present

Can a Fracture be Seen or Felt? If there is no wound a depressed fracture may be felt but care has to be taken to make sure as men tioned above that it is not simply a haematoma with hard clotted edge and soft fluctuating centre In the one it may be imperative to operate in the other it is equally imperative not to do so as a rule

In the case of a baby it is well to remember that a depressed fracture maybe of considerable size will often spontaneously evert without any interference very much like a dent in a ping pong ball It is worth while waiting some time to see if it will occur unless symptoms indicate an urgent operation

Where there is an open wound a fracture is usually easily both seen and felt but even here mistakes may be made The periosteum (peri cranium) may be split and the line of cleavage appears as a thin black or dark red streak very like a linear fracture and this may be con firmed to the satisfaction of the doctor by passing a probe over it when it jerks across the split very like a fracture A little care will avoid this error

In addition to these general and local manifestations of the injury a detailed investigation must be made to establish evidence of any focal intracranial lesion e g paralysis of intracranial nerves etc

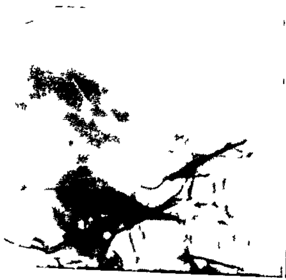
In view of the fact that considerable bruising of the brain and haemor rhage may occur in head injuries from *contre coup* the localising symp toms and signs may point to the opposite side of the brain to that which



Fig 256 X ray photograph Extensive linear fractures of the skull



Fig 257 Depressed fracture of the skull of an infant—birth injury



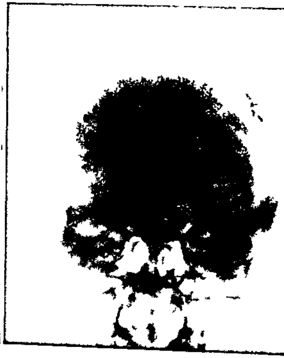
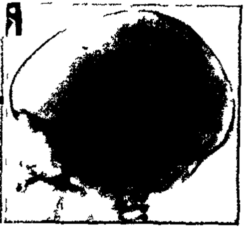


Fig 258 *a* and *b* Depressed fracture of the skull in an adult Two views are necessary to appreciate it



259





260a

260b





260

260d



261*a*

261*b*

Fig 259 Cephalhaematoma—birth injury

Fig 260 Cephalhaematoma—calcified outline centre cystic. *a* and *b* Early *c* and *d* Later

Fig 261 *a* and *b* (*a*) Cerebral irritation with characteristic curling up in bed following contusion of brain (*b*) Note shading of eyes from the light of a torch

would be anticipated In such cases it may be necessary to operate over that site as well as over that of the injury

In some cases, especially where doubt is present spinal puncture may be carried out to determine the pressure of the cerebrospinal fluid and its detailed examination, as to the presence of blood, etc (Figs 256 261)

SCHEME XIV

SWELLINGS OF THE THYROID GLAND SPECIAL FEATURES

A great deal of the theorising on the pathology of the thyroid gland is not universally accepted, and most men of large experience in the diseases of the gland hold their own views, which again are frequently not acceptable to others

HISTORY PRESENT CONDITION

Duration We are always faced with the uncertainty of the patient s powers of observation A swelling may have been present a long time and not been noticed until quite recently consequently a short history does not necessarily exclude pathology of long standing On the other hand a long history excludes anything of rapid development and short duration

A certain amount of thyroid swelling produces a fullness in the lower neck and some individuals consider this good rather than bad, in consequence of the general even outline of the neck from the filling out of the suprasternal fossa

The swellings may be purely functional or organic but some of the organic ones present functional disturbance as well The functional swellings present features which may be transient or intermittent or both They may appear e g with menstruation or pregnancy or from disturbances of the nervous system On the other hand a swelling with an organic basis is persistent although those with functional disturbances in addition may present variations in size The permanent organic swellings are more likely to be observed than the transient ones but one is quite familiar with the patient who presents a calcified adenoma which had probably been present for at least twenty years but which had only been noticed for a week or two

In acute inflammation of the gland the history is very short not only due to the rapid swelling but chiefly due to the associated pain

How was it first noticed? As is customary with swellings the patient may notice the swelling itself or it may be pain that draws attention to it In some cases however respiratory difficulty or changes in the voice may lead to its detection By far the largest proportion of the swellings

are spotted simply from their projection and the deformity they produce, i e, their cosmetic effect

Cause to which it is attributed As a rule the patient is unable to attribute a cause to it but, often in toxic swellings, worry and anxiety are considered to be responsible The association is brought to the patient s notice by the fact that the condition may be precipitated in twenty four hours by acute mental upset In connection with this, it must be borne in mind that thyroid toxicity will produce gross nervous and mental disturbance which may be attributed by the patient to worry and anxiety

Rate of Growth This varies very widely not only in the different pathological conditions, but also in different cases of the same pathological condition The most rapid increase in size occurs with haemorrhage which is likely to occur into a pre existing adenoma It may take place with almost startling suddenness

In the functional swellings, including the primary toxic ones, there may be a rapid increase In the toxic adenomata, there may be noticed an increase in size but it is very unlikely to be rapid In the non toxic goitre whether colloid or adenomatous there may be a steady enlargement, but it is not rapid

In malignant goitres we may or may not get a rapid increase in size, according to the activity of the growth If a goitre has been present for 10 15 years and then starts increasing rapidly, strong suspicions of malignancy must be entertained On the other hand, quite often malignancy is discovered in an adenomatous thyroid on microscopical investigation when there has been no development to suggest it clinically The inflammatory goitre, especially if it is an acute infection increases very rapidly over a few days The chronic inflammations are naturally, slower in their course

Fluctuations in size i e, sometimes increasing sometimes diminishing This feature is not at all uncommon The fluctuations may be sudden or gradual Menstruation plays a part here chiefly in relation to purely functional disorders in thyroids, with or without toxicity It is perhaps best seen in the exophthalmic goitres of young patients where the gland epithelium is active Worry in these cases may produce a rapid increase in size in two or three days, with an equally rapid decrease if the mental disturbance settles down

In case of haemorrhage into a pre existing adenoma there is a rapid increase in size usually with considerable pain, but as the blood is absorbed the swelling recedes again though not as a rule to its previous size

Pain The ordinary thyroid enlargements are not painful and, if pain is present, we are dealing with some complication The common cause of pain are inflammatory and malignant conditions and a sudden haemorrhage Acute thyroiditis especially if severe enough to go on to abscess

formation, is likely to be extremely painful The chronic inflammatory conditions will be less so, and some may have little or none Malignant infiltration is the commonest cause of pain, persisting longer though usually less severe than in acute inflammation

A sudden haemorrhage which usually occurs into a pre existing adenoma, though it may not have been recognised usually gives rise to a sudden acute pain, as the tension rapidly rises and, as mentioned above the pain is often responsible for the discovery of the adenoma Where no previous swelling has been noted it may appear over night One has seen a case where the patient was awakened in the early hours by pain and, on rising in the morning the lump was already there Another case occurred in a child where haemorrhage took place into a thyroglossal remnant and, on account of the sudden pain and the lump the patient was brought urgently to hospital with the seemingly absurd idea that it had swallowed a half penny

Evidence of Pressure This chiefly relates to the trachea and the oesophagus more especially the trachea with respiratory difficulty as the complaint though deglutition may also be disturbed The respiratory interference is likely to be particularly marked at night The reason is simple During the day the neck is on the stretch and the thyroid is at its highest position whereas at night in bed the neck is commonly in the position of flexion the normal position of rest, with the chin down towards the sternum In this position the thyroid is partly or wholly in the thoracic inlet and may thus cause pressure which would not be noticeable otherwise This observation has another clinical bearing viz that patients with suspected thyroids should always be examined in the upright position as the swelling may not be visible at all when the patient is lying down

Evidence of increased Thyroid activity i e simple increased metabolism The symptoms of this are very regular and consistent They include a feeling of being very hot with constant often profuse, easily elicited perspiration and palpitations increased excitability, and an unusually good appetite with wasting and loss of weight in spite of it The patient readily appreciates all these points

Evidence of Abnormal Thyroid Over activity This is commonly associated with all the evidences of increased metabolism but in addition there are the special features associated with exophthalmic goitre These are eye changes of which the most prominent are exophthalmos and the characteristic stare gastro intestinal crises as well as cardiac and nervous disturbances also in the nature of crises There is frequently a periodicity in these symptoms which is not seen in ordinary hyperthyroidism where we commonly meet a more continuous and perhaps progressive condition

Evidence of other associated Endocrine Disturbance This is chiefly

noted in menstrual disturbance and frequently in the occurrence of diabetes The exophthalmos, on the other hand, involves the pituitary, which is intimately connected with the thyroid Experimentally, exophthalmos is produced by stimulation of the pituitary in the presence of deficient thyroid activity The view here taken is that in the exophthalmic goitres although there is an excessive thyroid secretion with all the evidences of hyperthyroidism there is something in its make up which renders it, from the pituitary point of view, a deficient one

This is borne out by the investigations carried out before the present use of iodine therapeutically in exophthalmic goitres, especially pre operatively In those days it was shown that the thyroid tissue, per unit volume was grossly deficient in iodine compared to a normal gland, and that the organic iodine in the blood was greatly increased On the administration of iodine, the iodine in the tissue increased to normal, while the organic iodine in the blood diminished and the inorganic blood iodine greatly increased

The interpretation put on this is that the secretion of exophthalmic thyroids is abnormal, containing only 60 per cent of its normal iodine and that the secretion is passed immediately into the circulation without any attempt at storage, which is the normal function of the gland Following iodine the hyperplasia is arrested, the epithelium becomes more fully and normally formed the gland becomes a storage one with vesicles and plenty of colloid of good quality, and the uncontrolled passage of thyroxin into the blood is now regulated This is all seen microscopically in the gland changes, which are so definite that the pathologist can tell when iodine has been given

A further point of importance is that with the typical hyperplastic non storing gland of exophthalmic goitre we do not always get exophthalmos and these cases are typically seen in what we describe as the menopausal toxic goitre though it is not always the same The explanation offered is that rapid and excessive hyperplasia tends to the production of immature cells which revert, therefore to the foetal type In the typical young exophthalmic goitre patient the hyperplastic cells are less mature than those likely to be formed by patients about the age of the menopause although this may vary in different individuals The result is that some of the menopausal goitres do give rise to exophthalmos while others do not

Another point of interest is the response to iodine in the different types Nearly all exophthalmic goitres in young people are completely controlled by iodine in so far as their B M R is brought down to normal by it In the hyperplastic glands of later life, those which show exophthalmos are usually controlled to some extent by iodine, while some are completely controlled as in the young patient In terms of the above, the interpretation offered is that part of the secretion in these cases is

normal and part of it abnormal, and it is only the abnormal part which is altered by the iodine while the passage of both types into the blood stream is controlled, at any rate for a time, by the iodine and the gland begins to store This would explain also the varying degree of control by iodine of those menopausal glands without exophthalmos, entirely through the change over to a storage gland However as is well known the iodine control is only temporary and the menopausal glands particularly are liable to go on to progressively severe toxaemia, if the iodine is continued

In the other type of gland with de iodised tissue viz the colloid goitre of young girls, the administration of iodine raises the iodine content of the tissue to normal, so that the colloid becomes more concentrated and highly staining If the iodine is persisted in toxicity may develop especially if the swelling of the gland has persisted This toxicity is one of pure hyperthyroidism without any signs of the exophthalmic disturbance

If Iodine has been taken what Effect was noted? (*a*) Puberty thyroids the swelling probably arises because of inferior secretion, with a special demand on the gland As a result either hyperplasia or increased storage of thinly staining colloid takes place In most cases both conditions settle down but if they do not, the hyperplastic gland is apt to go on to exophthalmic goitre, while the colloid one leads to a permanently enlarged colloid goitre

If iodine is give early in these cases, both tend to become normal and the swelling disappears the hyperplastic gland undergoing a full evolution to a storage gland, and the colloid glands showing normal fully concentrated colloid

If iodine is not given until the enlargement has been present for some years the likelihood of its diminishing to normal is very small and the probability of precipitating toxicity by persisting with the iodine is quite marked This applies to both types

(*b*) In the exophthalmic goitres of young women the administration of iodine may be expected to control it 100 per cent temporarily, but it is likely to relapse whether or not the iodine is continued Its cyclical character which is not seen in the menopausal gland, may itself lead to a temporary relief This cyclical character is not altered by the iodine

(*c*) In the menopausal goitres the administration of iodine may benefit the patient from 0 100 per cent temporarily, but the likelihood of a relapse to toxicity and thereafter of its progressive increase is much greater than in the younger patients

(*d*) Toxic adenomatous goitres Thyroid adenomata like any other adenomata may or may not secrete and when they do so they are not controllable in the same way as the normal parent gland is However their behaviour to iodine administration is interesting Consistent with

their neoplastic nature there is no regularity in their response to iodine There may or may not be a response *in any type of adenoma* just as there may or may not be exophthalmos associated with the toxicity However experience here is that the hyperplastic adenomata *are more likely to be* associated with exophthalmos and are more likely to be controlled in greater or less measure by iodine than the colloid type i e, the so-called foetal adenoma conforms *much more to the exophthalmic type* of goitre including its response to iodine While the ordinary adenoma takes an average of about 15 years before it becomes toxic, the foetal adenoma may do so very quickly, and consequently it is the only toxic adenoma likely to be found in young patients with a short history Clinically from what has been said it is obvious that it is essential to try out the iodine before one can say whether benefit will accrue or not

Effect of Rest with or without Iodine This is an important point on which to get information as the cases of functional excess are much more likely to be benefited by rest than the neoplasms, i e, the adenoma and the carcinoma It is important too, to be able to say whether rest alone has been of value as both rest and iodine may benefit the grossly functional types while neither may help the neoplastic ones, though iodine is more likely to do so than rest

Exhibition of Thiourea and Allied Substances Compared with iodine these substances which have not yet been fully investigated present a different action They arrest secretion whether it be of the gland itself or an adenoma and whatever type of over secreting gland or adenoma is present In some cases chiefly following iodine administration the thyroid secretion is increased during the first week and it may be the end of the third week before the B M R approaches the normal level Otherwise it begins to drop at once and continues to do so from the start

The result of the cessation of secretion has been in our cases to reduce the tension both of the gland structure and also of the adenomata, and with this to reduce the vascularity However if the action is kept going too long the tension is so low that manipulation becomes difficult and the gland structure tends to fold on handling so that there may be increased difficulty in these cases in controlling haemorrhage Up to a certain point at all events, the softening of the gland helps the manipulation very much and many glands which were hard and inelastic become easier to deal with

Too long an administration of the drug may lead to an agranulocytosis and it has become a routine to examine the blood every week to avoid catastrophes while the arrest of thyroid secretion may permit the pituitary to cause a gross hyperplasia of the gland with the formation of a goitre itself apart from any enlargement which may have been present before An important point to remember is that the drug simply arrests secretion and does not alter it in any way so that on cessation of the



Fig 262 Persistent puberty colloid goitre—three year's duration no retrogression with iodine treatment



Fig 263 Diffuse colloid goitre in a native boy commencing at puberty (endemic type)



Fig 264 Diffuse colloid non toxic goitre of long duration



Fig 265 *a* and *b* Single non toxic colloid adenoma

Fig 266 Multiple non toxic colloid adenomata



Fig 267 Non toxic cyst adenoma







Fig 269 Primary menopausal toxic hyperplastic goitre in patient age 43 years with marked exophthalmos Toxicity only partially controlled by iodine.

Fig 268 Primary toxic hyperplastic goitre in girl of 16 years Marked exophthalmos toxicity temporarily completely controlled by iodine

Fig 270 Primary menopausal toxic hyperplastic goitre in a patient, aged 47 years with no exophthalmos May or may not be partially controlled by iodine

Fig 271 *a* and *b* Secondary toxic adenomatous goitre Adenoma of foetal type hyperplastic single not large short duration patient aged 22 years No exophthalmos though this is often present Iodine likely to be of help







Fig 272 *a* and *b* Secondary toxic adenomatous goitre Multiple colloid adenomata in patient aged 46 years of long duration No exophthalmos and usually absent Unlikely to be helped by iodine



Fig 273 *a* and *b* Primary carcinoma of thyroid early affecting the gland diffusely No secondaries present In *b* Extension by continuity of tissue involving the skin



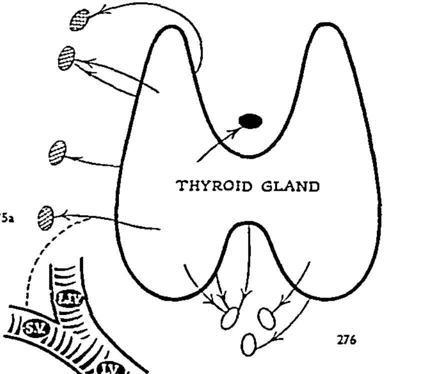
Fig 274 *a* and *b* Carcinoma of thyroid secondary to colloid adenoma with involvement of glands of drainage Primary growth continuing localised and well defined



275a



275b



276

Fig 275 a and b Adeno-carcinoma of the thyroid in a native woman fungating through the skin (Dr Michael Gelfand)

Fig 276 Diagram of lymph drainage of the thyroid gland.



Fig 277 X ray photograph Osteo-lytic secondary in the skull of the patient in Fig 274



Fig 278 X ray photograph Secondaries in lungs in case of carcinoma of thyroid The smallish size of the metastases is the usual



Fig 279 *a* and *b* Simple cyst adenoma developing in aberrant thyroid tissue

treatment the gland goes back to what it was before As a result of this it is our practice now to give iodine as well in the exophthalmic goitre cases, in order to avoid the occurrence of crises afterwards, as these are the most likely thing to kill the patient and attacks like crises had been noted in cases to which no iodine had been given

Evidence of Infiltration This in thyroids is chiefly malignant, though it may be inflammatory The ordinary simple enlargements of the thyroid, whether neoplastic or not tend to displace surrounding struc ures e g, the carotid sheath, but malignant and inflammatory con ditions tend to infiltrate and surround them, without displacing them

The commonest indications as noted by the patient are alteration in the voice and eye changes apart from the exophthalmos already mentioned, usually one sided Huskiness of the voice suggests involve ment of the recurrent laryngeal nerve, while involvement of the cervical sympathetic according to whether the infiltration is irritating and stimulating it or whether it has destroyed it will produce an unusual prominence of the eye with dilated pupil or recession of the eyeball with a small contracted pupil Except for gross infiltration, e g of the overlying skin, the patient is unlikely to notice anything more than these (Figs 262 279)

PHYSICAL EXAMINATION GENERAL

Look for evidences of (*a*) *Hyperfunction* e g excitability, nervousness, sweating and wasting also the fine tremors of the fingers and tongue and cardiac disturbance Tremors of the tongue are only seen in the more marked cases A striking feature of the tremors is that, after radical operation they are usually already gone by the fourth day

The commonest feature of the cardiac disturbance is tachycardia, which may or may not be associated with organic changes In the latter case there may be fibrillation and even varying degrees of cardiac failure Hence the risks may not only be those of the toxicity but also of the heart condition

The more serious heart involvement is likely to be seen in the older patients In exophthalmic goitre the patient is usually young and the toxicity is cyclical With the marked resilience of the patient while the symptoms are often very marked the organic changes are usually light and the recoverability good In older patients with less reserve and a toxicity which tends to be continuous and progressive as seen in the toxic adenomas organic disease is much more likely and recoverability much less In such patients it is most important to assess the cardiac condition carefully before embarking on an operation

(*b*) *Infection* inflammatory fever and focal sepsis

(*c*) *Malignant disease* cachexia

Special eye signs are the stare and exophthalmos Van Graefe s sign

lagging of the upper eyelid, Moebius' sign, loss of convergence, Stellwag's sign excessive retraction of the upper eyelid, and Joffroy's sign, absence of wrinkling of the forehead on looking up These are all associated with the exophthalmos of exophthalmic goitre

PHYSICAL EXAMINATION LOCAL

Inspection

Swelling in the region of the thyroid gland Absence of obvious enlargement does not necessarily mean that the thyroid is not at fault Occasionally we have all the usual toxic disturbances and the thyroid is normal in size or even less than normal A rare condition which has been called thyreorrhoea gives gross toxicity but the gland appears normal both macroscopically and microscopically Again at times, no enlargement of the thyroid is felt though at operation it may be found to be considerably enlarged This may arise from the consistency of the gland being exactly the same as that of the surrounding structures or the gland may have enlarged more from the posterior and medial aspects of the lobes and so have tucked in behind the trachea and the larynx Naturally a gland which is mostly substernal may be felt with difficulty

However in the average thyroid case we may reasonably expect a swelling in the region of the thyroid which covers the lateral aspect of the thyroid cartilage the cricoid and the upper part of the trachea, while the isthmus lies over the second third and fourth tracheal rings When affecting the whole gland it is sometimes described as a butterfly swelling but this requires a good stretch of the imagination

Diffuse or Localised symmetrical or not Diffuse enlargement and symmetry are not synonymous, as one side is usually larger than the other If symmetry is approached the disease is likely to be any enlargement in preference to neoplasm, but on the other hand, a diffuse grossly irregular enlargement is more likely to be neoplastic than any of the others A localised enlargement will almost certainly be neoplastic As can be appreciated from these statements, no type of enlargement is strictly characteristic of any one condition The diffuse enlargements include the functional cases the aftermath of those either hyperplastic or colloid goitres the inflammations acute and chronic and neoplasms simple and malignant while the localised swellings are commonly neoplasms but localised inflammatory conditions must be included e g abscess

Even or Irregular Evenness of the swelling strongly favours those conditions other than neoplasms while irregularity favours the neoplasms, almost to the complete exclusion of the other diseases

Pulsation This carries with it little significance except that of hyper

aemia It does not necessarily mean that the thyroid condition is serious, or that it is toxic and, in fact, often the greatest pulsation is found in the simple non toxic colloid goitre

Change in the Overlying Skin No change is expected or seen in the ordinary thyroid case, as the gland lies deep to the platysma and two layers of depressor muscles together with the associated layers of the deep cervical fascia Involvement of the skin therefore, means inflam matory or malignant infiltration, the inflammatory infiltration presenting the signs of inflammation at the same time

Movement on Swallowing Anything that is attached to the larynx will move on swallowing provided the larynx is free, and the average thyroid swelling does so On the other hand the thyroid swelling may be fixed either by being partially thoracic, or by infiltration of sur rounding structures in the case of inflammatory or malignant goitres

PALPATION

First of all feel for what you have seen and confirm or negative it, e g, whether the swelling is diffuse or localised whether smooth or irregular, whether symmetrical or not and whether there is pulsation or not In addition it is necessary, as usual, to consider the swelling from the points of view of consistency surface edge and relations

Consistency Is the consistency even or does it vary in different parts?

In the puberty goitres whether hyperplastic or colloid, they present an even consistency usually fairly soft If either of these goitres persists it is liable to become irregular after the age of twenty years and this indicates the beginning of the development of adenomata, with or without capsules In the inflammatory goitres the consistency varies with the type acute or chronic and the termination of the inflammation e g fibrosis when the goitre may be hard and woody or abscess formation, when a fluctuating area is present surrounded by firm and harder swelling

The exophthalmic goitres of young women are usually even and soft, though they vary considerably and are likely to be harder if persistent iodine treatment has been carried out

In the primary toxic goitres of the menopause the gland may be even though it is sometimes rather finely granular to the feel but as a rule it is much harder and firmer than the ordinary exophthalmic case

The consistency of the adenomata varies very widely for a variety of reasons Their age may affect them, as they may become calcified their rate of growth also the more rapid the softer as a rule, a degeneration which is common in these adenomata is likely to produce a soft fluctuant or semifluctuant change The cystadenoma as its name implies also produces a soft more or less fluctuant swelling, and it may reach a very large size Haemorrhage, often associated with

degeneration produces marked increased tension and hardening, when it occurs, but it rapidly softens as absorption takes place Should malig nancy supervene, there may be no change at all to palpation, as the alteration is likely to occur gradually and 50 per cent at least of them are first recognized by miscroscopy On the other hand in a well advanced case, the malignant disease will almost certainly cause increased hardening of the swelling In these cases the carcinoma is *confined inside the* capsule of the adenoma for a considerable time and this serves to mask the change which has taken place

Primary carcinoma presents, as a rule, the usual stony hardness of the swelling and this is likely to be diffuse when the patient is seen

Surface The chief point is its evenness or irregularity Most of the swellings other than neoplastic ones are even on the surface, but the inflammatory ones depending on their progress, may present unevenness Irregularity on the other hand is the hallmark of neoplastic change as a rule In the case of the very large adenomatous swellings while the general surface is irregular, the surface of the nodules or lobules is smooth but one may get a detailed diffuse irregularity in the case of so-called adenomatosis representing the commencement of adenomata which have not yet got capsules and are still small or it may be found in the subsequently developing carcinoma with its tendency to infiltrate the capsule and beyond just as is seen e g in the breast

Edge In the ordinary goitre case the edge of the swelling is well defined but this may be interfered with for several reasons

The lower border may be below the level of the thoracic inlet The so-called substernal goitre usually comes up with deglutition and the lower border can then be felt If it is lower still, the so called retro sternal goitre, it is unlikely to come up on deglutition and so its lower edge can never be felt As was mentioned above, even with an ordinary goitre which is entirely suprasternal the lower border may pass into the thorax when the patient leans forward as when lying in bed, and so it is advisable always to examine the patient in the upright position

Inflammatory and malignant goitres, if infiltrating will both render the edge much less distinct than usual A further point which has been mentioned but which is not generally recognized is that where the consistency of the goitre is the same as that of the surrounding struc tures of the neck not only may it be difficult to gauge the size by palpa tion but it may be equally difficult or even impossible to define the edge

Relations These include particularly the results of extension by continuity and contiguity of tissue, which tend to fix the swelling since the average thyroid swelling is freely mobile except for its attachment to the larynx and the trachea In view of this normal attachment infil tration is only likely to be diagnosed by involvement of the recurrent laryngeal nerve and the subsequent voice changes e g huskiness

In the case of simple adenomata particularly and, much less likely a localised malignant growth, i e one developing in a previous adenoma, the trachea may be displaced laterally by pressure and it can usually be felt passing to one or other side of the mid line as the case may be It may also be flattened antero posteriorly by a tumour of the isthmus or flattened laterally by bilateral tumours The latter displacement may not be ascertainable by palpation and other means of discovery may require to be used e g endoscopy or radiography This is most important to know, as the displacements may lead to serious respiratory embarrass ment during operating unless an intra tracheal tube is first introduced

Sterno mastoid infiltration can be palpated with its fixation of the gland on contraction.

Skin infiltration is late, the inflammatory type being accompanied by signs of inflammation while the malignant type tends to pucker down the skin first and gradually infiltrate it there being no signs of inflammation present

The Carotid Sheath and Cervical Sympathetic Here the simple thyroid enlargements displace the sheath backwards and outwards so that the carotid can be felt at the posterior border of the sterno-mastoid In the malignant (or inflammatory) infiltration the sheath is surrounded and embedded in the swelling without actual displacement The carotid may not be felt at all except above, and possibly below the swelling The involvement of the sympathetic produces proptosis and dilatation of the pupil during the irritative stage and enophthalmos and con traction of the pupil in the paralyzed stage

Encroachment upon the thoracic inlet is very important as operative removal may be greatly hampered If the swelling is mobile there may be little or no extra difficulty, but if it is fixed either by being jammed or adherent as in the case of some calcified adenomata the operation may be exceedingly difficult and dangerous It may be necessary to remove such an adenoma by doing so inside its own capsule as it may be inseparably fixed to the left innominate vein

Enlargement of the Lymph Glands of Drainage In cases of infection and malignancy involvement of the lymph glands of drainage is likely to be early and widespread because of the free lymph drainage of the gland As the thymus is developed from the same branchial cleft there is a free lymphatic inter communication between them especially in the lower animals and in addition lymphatic vessels may drain directly into the internal jugular or subclavian or innominate veins this again chiefly in the lower animals but also demonstrated in man

The glands may be felt over the crico thyroid membrane below the isthmus in the supra sternal notch or they may be behind the sternum (not felt) and above opposite or below the lobe of the thyroid gland

Evidence of Blood Spread Not only because of the excessive vascu

larity of the thyroid but also as mentioned above because of the possible direct lymph drainage into the jugular or other big vein the likelihood of blood spread in cases of carcinoma of the thyroid is very great indeed The tendency is for the secondaries to settle in the bones producing as a rule a remarkably clear-cut destruction resembling closely a non malignant process, as there often appears to be no infiltration but rather a capsule Secondaries in the lung tend to be multiple and small and massive deposits are uncommon

While local infiltration by continuity of tissue and resulting fixation of the growth are more common in the primary carcinoma metastases, either by lymph or blood spread are more frequently seen in carcinoma secondary to a simple adenoma This may be due both to the late recognition of the condition and also to the capsule of the adenoma confining the growth and raising the tension in it

PERCUSSION

This is chiefly of value in reference to those goitres which are suspected of extending into the thorax It is well to keep in mind that there is often a relative impairment of note over the manubrium sterni, when everything is normal However the presence of dullness calls for more detailed and careful examination

AUSCULTATION

A bruit is often heard over a thyroid swelling especially if pulsation is present Its significance is about the same as that of the pulsation viz it indicates great vascularity although all thyroids are very vascular

SPECIAL EXAMINATION

Laryngoscopic examination is done to confirm or negative a suspected recurrent laryngeal nerve involvement by seeing the paralyzed cord In addition, the endoscopy may reveal any of the displacements mentioned above especially the antero posterior or lateral flattening which cannot be felt

Radiography This is of value in determining the position and appearance (displacement) of the trachea in showing up an intra thoracic goitre and also in demonstrating metastases in the bones where blood spread is suspected These investigations of the trachea were of special importance before the use of the intra tracheal tube for anaesthesia was instituted It is still very important from the surgeon s point of view to know the extent of an intra thoracic growth and it is important from everyone s point of view to know whether metastases have occurred, as it controls the treatment

Basal metabolic rate before and after the use of iodine Under proper conditions the B M R is a most useful test of the function of the thyroid gland As ideal conditions are mostly unattainable the B M R

assessment errs, if at all, on the high side, so that if there is any doubt of the conditions of the test, a useful guide is to knock off 10 per cent, and if the assessment is still above the normal limits then we may accept the case as one of hyperthyroidism The value of taking the B M R after a course of Lugol s iodine 10 minims three times a day for ten days is to see how the toxaemia has been controlled What benefit is derived depends on changing over a hyperplastic non storing gland into a storing gland, and rendering an abnormal secretion if there be one, normal

In the case of the exophthalmic goitres, as mentioned above, we may expect a normal B M R in ten days In such cases not only is the toxicity destroyed *pro tem*, and the operative risk correspondingly reduced but the risk of post operative crises from which these patients mostly used to die is entirely avoided especially if the iodine is continued for a short time after the operation On the other hand in those cases where there is no benefit derived from iodine or in which the B M R may actually rise the important thing to keep in mind is that the risk is almost entirely a cardiac one, and in any case there will be no post operative crises

In such cases, now, one advises *a course of thiourea* to bring the B M R down to near the normal limit before operating as the removal of the toxaemia is undoubtedly beneficial In the presence of exoph thalmo, where there is only a partial improvement from iodine it is better to combine iodine and thiourea for the safest outlook

In the case of toxic adenomata, if they are uncontrolled by iodine, and especially if the grade of toxicity is a severe one then a course of *thiourea is advisable before operating as the relief of the toxicity is* likely to ease the cardiac disturbance

A further point that one has always emphasized is the necessity for the least and slightest possible manipulation of the gland during removal, as there can be no doubt that severe handling of the gland results in the forcing of much thyroid secretion into the circulation with an acute increase of the toxaemia temporarily

The clinical results of the administration of iodine usually correspond closely to the results as obtained from the B M R

SCHEME XX

JAUNDICE SPECIAL FEATURES

In *considering* jaundice it has always to be borne in mind that while marked degrees of it are unmistakable, the mild cases may be missed or coloration may be diagnosed as jaundice when there is none and when the patient is just sallow, with perhaps, some anaemia as well

As a condition it is apt to be regarded as involved and confusing but knowledge of its causation and relations dispels all this and makes it easy to fathom and get a grip of Grouped the sources of the jaundice may be regarded as comprising blood changes, liver disturbances and interference with the ducts, leading to obstruction Generally speaking, blood jaundices are almos all med cal duct jaundices are all surgical and the liver jaundices may be either, but are mostly medical

HISTORY PRESENT CONDITION

ONSET

Whether sudden or gradual and with or without pain? A sudden onset suggests a mechanical cause of which the commonest is stone, while a gradual onset strongly favours inflammatory or malignant changes

Cases of sudden onset are mostly surgical, while those of gradual onset are mostly medical By the time a carcinoma has produced jaundice especially from secondaries in the liver, the case has ceased to be a surgical proposition, and very few carcinomas blocking the ducts are eradicable, and those only in the earliest stages If the onset is associated with pain the cases are nearly all surgical, while those without pain are nearly all medical

An apparently outstanding exception to the latter group is the carcinoma of the head of the pancreas, which so frequently produces a painless jaundice but, in these cases, surgical intervention is almost invariably though necessary only a palliative measure, and the case remains therefore chiefly medical

PAIN

Whether Preceding or Following the Jaundice If pain precedes the jaundice, it is commonly obstructive and therefore surgical If on the other hand it follows the jaundice it is much more likely to be medical, e g ,

malignant metastases in the liver may produce a mild grade jaundice fairly early, but they do not produce pain till they cause irritation of the overlying parietal peritoneum A gall stone in the common duct however, starts the attack with the typical pain followed by jaundice the next day

Characters of the Pain With a complete block of the gall bladder or ducts we get the same pain as we expect in any hollow muscular system, viz, a continuous pain from the persistent high tension together with intermittent exacerbations due to the peristaltic contractions The continuous pain is likely to be described as gnawing though it may be quite severe while the intermittent pain is described as colicky Increased tension inside the hepatic capsule is likely to give a milder grade of gnawing persistent pain If the obstruction is not complete and each peristaltic effort gets rid of some of the blocked contents and so relieves the tension the pain is intermittent and typically colicky, with relief between the contractions The variations in colics have previously been discussed

A third type of pain which may be met is stabbing in character and indicates irritation of the covering parietal serous membrane and in cases of jaundice this means that the disease has extended to the surface of the liver Continuous pain may be present but the stabbing pain is intermittent, in these cases chiefly caused by the respiratory movements Infiltration whether inflammatory or malignant as opposed to the irritative pain just described is typically gnawing and continuous in character

Sudden Onset and Cessation or Not? As has been mentioned a sudden onset suggests a mechanical attack and a sudden cessation of pain indicates the same thing The combination of the two strongly suggests an absence of any complicating infection and inflammation As was discussed under calculi the presence of infection and inflammation is often responsible for the initiation of the attack by a relight of activity

The inflammation precedes the mechanical block of the stone commences gently as a rule and so gives the patient warning of the likelihood of a severe attack developing In such cases while the very severe colicky pain may be relieved suddenly a persistence of a milder gnawing pain remains due to the inflammation Hence there is neither a sudden onset nor a sudden cessation as in the uncomplicated purely mechanical condition which in addition gives no warning of its likely onset

Where blockage is purely inflammatory in origin and there is no stone at all the pain commences mildly and gradually and progres sively works up to a maximum but there is no sudden exacerbation or relief as is found in the case of stone and after reaching its maxi mum and perhaps persisting at that for some time it gradually decreases sometimes over a period of three or four days

Severity The most severe pains are associated with the mechanical attacks On the other hand, a purely inflammatory attack gradually increases in severity, but it rarely reaches the severity of the purely mechanical cases before it begins to diminish This is no doubt in part due to the infiltration of the muscular wall interfering with its contractile power

In malignant cases, the infiltration leading to the block occurs much more slowly than in the case of inflammation and consequently one is more likely to get pain and of a more severe degree in inflammatory than in malignant cases Whereas an inflammatory block may develop in two or three days or even less a malignant one may take months, the result being that the malignant one may be unassociated with pain at all as seen in carcinoma of the head of the pancreas (Figs 280 284)

CHARACTERS OF THE JAUNDICE

Tint and Depth All grades are met, from the lightest canary yellow to green and black The light jaundices include the vast majority of the medical and some of the surgical cases while the deep dark jaundices are surgical The light surgical jaundices are chiefly those with transient obstruction the medical ones are mostly non obstructive The green and black jaundices are essentially those of persistent complete obstruction

Occurring in Attacks Periodic or recurring attacks of jaundice are particularly likely to be surgical

Duration of Attacks In the passage or attempted passage of stones the duration of the jaundice should it occur is very informative It bears a distinct relationship to the size of the stone

A pinhead stone will pass from the gall bladder into the duodenum in half to two hours without jaundice occurring at all A stone about the size of a split pea or lentil takes about eight hours to pass, and with this we expect a jaundice lasting for about three days A stone in the common duct or one reaching it but not passing into the duodenum will give a jaundice lasting eight to ten days, with each attack A stone which never gets beyond the gall bladder or cystic duct during the attack may be followed by a jaundice lasting four to six weeks This means that an associated cholangitis is present The jaundice never becomes dark and at all events in the early days a distended gall bladder is usually felt

As opposed to this type of case the so called catarrhal jaundice of the physicians is also likely to last four to six weeks, and in appearance is the same but no distended gall bladder is met The surgical case starts with very severe pain the medical one with mild pain or none worth speaking of

A stone in the common duct associated with grossly septic cholangitis is likely to produce a continuous jaundice with fluctuations

GRAPHS OF PAIN IN BILIARY ATTACKS

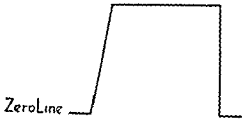


Fig 280 Stone alone Sudden onset rapidly extreme persisting at height for some time sudden cessation with complete relief



Fig 281 Inflammation alone Gradual onset slowly increasing to maximum of less intensity than in Fig 280 persisting at this level for varying period slowly diminishing with gradual relief



Fig 282 Stone attack first followed by inflammation—sudden onset rapidly extreme period of persistence at height sudden partial relief followed by further gradual easing off and relief



Fig 283 Inflammatory attack first followed by stone block—gradual onset slow increase of intensity at first to moderate height then sudden exacerbation rapidly becoming extreme period of persistence at height followed by sudden partial relief and then further gradual easing off and relief



Fig 284 Stone attack followed by impaction but without inflammation Sudden onset rapidly extreme persistence at height longer than usual and then very slowly easing off with progressive relief though some discomfort may last for a long time

GRAPHS OF TYPES OF JAUNDICE

Zero Line



Fig 285 Passage of small stone from gall bladder to duodenum average time eight hours Jaundice appears the next day quite mild and lasts three days

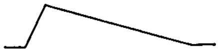


Fig 286 Stone in the *common duct* not passed Jaundice follows in a few hours is more intense than in Fig 285 but still mild and usually lasts about 8 10 days

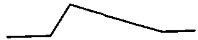


Fig 287 Stone in common duct with pyogenic cholangitis In termittent Biliary Fever Con tinuous mild jaundice with exacerbations following rigors but without pain The jaundice increases to a degree some what deeper than in Fig 286 but never deep



Fig 288 Gall stone in the *gall bladder* with septic cho langitis Jaundice is somewhat later in appearing after the attack than above reaches its maximum in a few days retains this degree for two to three weeks and takes two to three weeks to disappear gradually It is a bright yellow jaundice resembling that of the catarrhal jaundice of the physicians and lasts about the same time

ZeroLine



Fig 289 Progressive jaundice steadily becoming deeper un til ultimately described as black This occurs in malig nant obstruction of the main duct It deepens fairly quickly at first and then progresses more slowly



Fig 290 Secondary malignant disease of the liver without obstruction of the large ducts Slowly developing very mild degree of jaundice which is persistent Even where it may be too mild for clinical recog nition the blood will often show an icteric index double the normal



Fig 291 Acholuric jaundice with complications from stone or exacerbations of the dis ease—here there is continu ous jaundice often of so mild a degree that the patient may just be regarded as being par ticularly sallow Any of the jaundices of stone may be superadded and exacerbations of the disease may cause tem porary increases In late stages the jaundice is likely to be intensified and show a higher level

in its depth These are usually late cases and the duct has ceased to contract, so that there is no pain The remissions of jaundice follow rigors, but no pain develops with the attack It has rather misleadingly been called intermittent biliary fever (Figs 285 291)

Frequency of Attacks The more frequent the attacks the more likely is there to be a stone in the ducts in this case with jaundice in the common duct At the same time the greater the frequency of attacks the greater the likelihood of associated infection with inflammation

If the attacks occur with pain *do they occur with every attack of pain?* The presence of pain suggests the presence of a stone If jaundice occurs with every attack of pain, there is almost certain to be a stone in the common duct If, on the other hand we find that some of the attacks are followed by jaundice and others are not, we commonly find multiple stones of varying sizes, with small ones, in the gall bladder and none in the common duct The explanation is that some of the stones are small enough to pass without jaundice, some pass with it occurring and some never leave the gall bladder at all during the attack The jaundice, in these cases when it occurs is of the three day type

A big stone in the gall bladder may produce a severe attack followed by a six weeks jaundice as referred to above but such an attack is almost never repeated On the other hand such patients will often give a history of attacks lasting for years but no other attack was associated with jaundice

Should there be no pain with the attacks it does not mean that there is no stone As mentioned above a common duct stone may ultimately lead to frequently repeated obstruction without pain but with a rigor on each occasion the jaundice being continuous with fluctuations In such cases the earlier history may be one of attacks with pain but latterly the duct becomes dilated and incapable of contraction It is simply an example of the late stage of obstruction in any hollow muscular system but the poverty of muscle in the common duct wall leads to the unusually rapid dilatation with loss of contractile function

Steady Jaundice A steady continuous jaundice i e one which is persistent but does not deepen is much more likely to be medical than surgical The exceptions are acholuric jaundice stone in the common duct with severe septic cholangitis and stone in the gall bladder with an associated cholangitis One must repeat in connection with the last two (1) that the jaundice of the common duct stone and septic cholangitis is continuous but it fluctuates and never becomes dark and (2) the jaundice of the stone in the gall bladder with cholangitis persists only for six weeks and usually begins to fade after three or four weeks In acholuric jaundice there is usually a persistent mild grade of jaundice which is often only considered to be a marked sallowness by the patient and his or her friends and which from time to time shows mild exacer

bations often with feverish attacks The subsequent development of gall stones may later complicate the picture by the intrusion of typical gall stone attacks, with or without jaundice, according to the situation of the stones In the first stages, the depth of the jaundice may be permanently increased

Progressive Jaundice This is much *more likely to be surgical than* medical and is typical of the permanent complete obstructions, steadily becoming deeper and darker In biliary cirrhosis which is essentially medical except for the attempts made to divert the portal blood, while there is a tendency for the jaundice to be progressive, it rarely becomes as dark as in the straightforward obstructions, e g , as a result of carci noma of the head of the pancreas or enlarged lymph glands usually malignant in the portal fissure

Associated Inflammatory Fever The patient is only likely to be aware of fever if it is acute If the attacks are accompanied by fever obvious to the patient it means an acute infection If accompanied by one or more rigors it suggests duct rather than gall bladder infection (cf pyelitis and cystitis) Jaundice complicates many medical inflammatory fevers e g malaria It is usually relatively light

Has a Swelling been noticed? As a rule even in the presence of a swelling the patient is unaware of it and can give no positive information In the first place most of the patients are of portly habit and in the acute attacks with or without inflammatory fever there is con siderable tenderness so that sufficient pressure is not applied to be able to feel a distended gall bladder Occasionally, however they claim to be able to feel it but one must differentiate it very carefully from the general feeling of distention in the upper abdomen which is usually complained of In cases of carcinoma of the head of the pancreas on the other hand with the emaciation and loss of weight, *together with* the absence of inflammation the distended gall bladder may be seen *as well as felt The fact however that the patient has not discovered the* swelling does not mean that it is not there

Faeces The patient in more likely to notice a change in the colour of the faeces rather than in their bulk Surgical jaundices except where the stone is still in the gall bladder are usually obstructive and there fore the faeces show the absence of bile in the great majority of cases, with the appearance of a whitish putty like stool In the inflammatory obstructions the block is rarely complete and the stool *therefore retains* its brownish colour This applies to the majority of the medical jaundices where some bile almost always gets *through The bulk of the stool*, on the other hand, is increased as the bile reaching it is diminished below that *necessary for fat absorption* and this is greatly increased if the pancreatic ducts are simultaneously obstructed A pancreatic block *itself* will always produce a great increase in the stool but for bile

obstruction alone to produce it, the amount reaching the gut has to be drastically reduced, otherwise nothing would be noticed by the patient

Loss of Weight Whether or not there is loss of weight has quite an important bearing on the case In the purely mechanical obstructions due to gall stones, there is no loss of weight before the development of jaundice—loss of weight later, in gall stones, with jaundice, may be due to infection (cholecystitis or cholangitis), interference with liver function due to back pressure, and digestive disturbances due to the obstruction of bile and possibly pancreatic juice Loss of weight preceding the jaundice on the other hand, may suggest the possibility of carcinoma as, either in carcinoma of the head of the pancreas or in liver secondaries the occurrence of the jaundice is a late event and hence the disease has had time to produce cachexia and wasting, before the jaundice appears It has always to be remembered that, in early cancer, the patient may actually put on weight, because of the malaise and feeling of lethargy and the giving up of exercise and only later, because of anorexia, he begins to lose it

It has been found recently in *some* cases of chronic jaundice, e g, due to carcinoma (Dr F Ziady, personal communication) that the B M R is much raised This may be the chief cause of the loss of weight in such cases, seeing that these patients have no appetite and take very little nourishment Considering that, in thyrotoxicosis in spite of an abnormally large appetite, weight is rapidly lost, the loss in these cases must be excessive More work requires to be done in confirmation of these findings

Condition immediately preceding onset of Jaundice Where a purely mechanical condition holds e g with stone, the patient's general state of health is not interfered with before the attack but should infection and inflammation be already present, deterioration of condition will be evident varying with the severity of the infection and its duration. The same applies in carcinoma where, whether the jaundice be associated with the primary growth or metastases it is a late occurrence and cachexia in greater or less degree will have developed

[PREVIOUS HISTORY

Previous attacks of similar nature may be reported but while such a story is usually reliable, it has to be remembered that patients will sometimes think they are jaundiced when they are not, and, in mild cases, may not notice that they are jaundiced Where the jaundice is fairly well marked it is usually observed This is quite important as in these cases the diagnosis may depend entirely on the history Previous similar attacks strongly suggest stone or inflammation or both and also that the case is a surgical one The main focus of infection may be a cholecystitis a cholangitis or a pancreatitis

Malignant disease can almost certainly be ruled out, except where it has developed on the basis of a cholelithiasis and even here the likelihood of the previous attack *being accompanied by jaundice is very small*

In the absence of previous similar attacks, the earlier history may be suggestive of gall stones, with or without jaundice, inflammatory conditions dysentery, the primary focus in carcinoma, *bilharziasis*, etc

FAMILY HISTORY

Familial tendencies may be present in patients the subjects of jaundice, e g, adiposity is a feature of most gall stone cases, and the familial nature of this is borne out by the statement, 'look at the mother and you will see what the daughter will be ' It is correct in the majority of instances Acholuric jaundice may be congenital or acquired The jaundice is usually so light that it is missed by the laity, who consider the patient to be very sallow complexioned However, except with the aid of cosmetics women may be handicapped as to their clothing since certain colours will be impossible for them to wear Should gall stones which commonly develop give rise to attacks, additional jaundice may draw attention to the condition

PHYSICAL EXAMINATION GENERAL

In the general condition wasting is the outstanding feature and it may *either be due to the underlying cause or following the jaundice itself* if it be deep and chronic The absence of wasting suggests a recent development and non malignancy The depth of the jaundice is most *important the lighter ones including almost all the medical cases* and the surgical ones of transient nature the darker, greenish black ones being almost wholly surgical and including the permanent complete obstructions *whether simple or malignant In chronic* jaundice *the* pulse is usually slow and, if inflammatory fever is present, it is slow relative to the temperature A fast pulse is a bad prognostic sign and *indicative of failing condition*

PHYSICAL EXAMINATION LOCAL

INSPECTION

Is any swelling visible in the liver region? If a swelling be present, it is more likely to be seen in thin or emaciated patients A diffuse swelling with deep jaundice definitely points to an extra hepatic cause viz obstruction of the common bile duct In secondary carcinoma the liver may be quite large, but it is irregular, and the jaundice is relatively light unless the common duct is obstructed also In biliary cirrhosis there may be great enlargement of the liver early but the jaundice is not at this stage anything like as deep as in the complete abstruction In

obstructive jaundice there is always swelling of the blocked liver whether it is visible or not, unless cirrhosis is already present, and contraction of the fibrous tissue has not yet taken place

A localised liver swelling suggests an hepatic origin and a surgical case, e g, amoebic abscess, hydatid, etc The localised swelling how ever may be the gall bladder, when it usually appears much better defined than the intra hepatic lumps, and this points to a common duct obstruction as a rule It may be a blocked gall bladder (e g, due to stone or carcinoma) with additional common duct pathology, (e g cholan gitis or block of the common hepatic duct by enlarged glands in the portal fissure) but this is the exception (Figs 292 295)

PALPATION

Is there a swelling of the liver as opposed to the gall bladder? If there is no swelling then it is likely to be a medical case but, on the other hand, the transient jaundice of stone passage does not usually give rise to a palpable enlargement of the liver

If a swelling is present it may be diffuse or localised The palpation may confirm the inspection or lead to the discovery of a swelling that could not be seen A diffuse even swelling may be either medical when it is hepatic in origin or surgical, when it is extra hepatic in its cause as a rule i e a common duct obstruction A diffuse irregular swelling of the liver is commonly due to secondary malignant disease or gum mata and unlikely to be benefited by surgery A localised swelling in the large majority of cases is surgical e g, amoebic abscess or hydatid cyst Gumma and malignant disease are commonly seen by a surgeon

Tenderness of the swelling may be due to increased tension and the more rapidly the tension develops and the greater it becomes, the more likely is the tenderness to be marked In slowly developing tension tenderness is likely to be minimal or absent Inflammatory conditions are more likely to be associated with tenderness than early malignant ones and acute mechanical blocks lead to severe degrees of it e g a hepatitis usually causes considerable tenderness while an early secondary carcinomatous liver does not and a common duct obstruction due to stone produces tenderness while that due to carcinoma of the head of the pancreas does not Back pressure from a failing heart leads to a tender swollen liver In the localised swellings the degree of tension depends on their rate of development e g an uncomplicated hydatid is painless and not tender at all while a suppurating hydatid with its rapid increase in size is acutely tender A further cause of tenderness is irritation of the parietal peritoneum over the swelling and this is well demonstrated in peri hepatitis and late secondary malignant disease with growths projecting on the surface



292



293

Fig 292 Specimen Multiple *amoebic abscesses in the liver*

Fig 293 Specimen Multiple hydatid cysts in the liver

Fig 294 a and b X ray photographs Huge hydatid mother cyst of the right lobe of the liver with numerous daughter cysts infected and containing gas (*a*) Patient recumbent. Daughter cysts clearly outlined (b) Patient erect. Gas with fluid level and outline of daughter cysts

Fig 295 Specimen Primary carcinoma of the liver



294a



294b



295

these physical signs are not against the diagnosis of carcinoma. The jaundice in such cases is likely to be due to infiltration or secondary glands in the portia hepatis blocking the common hepatic duct.

Where the infection and the inflammation have extended to involve the peritoneum including the parietal layer the resulting rigidity may completely cover up the distended gall bladder and so render it either very difficult or even impossible to feel

Is the Swelling of the Gall bladder associated with Enlargement of the Liver or not? If it is it is strongly suggestive of a main bile-duct obstruction. In carcinoma of the head of the pancreas both gall bladder and liver are markedly distended and enlarged and the same applies in the case of a carcinoma of the neck of the gall bladder with secondary glands in the portal fissure On the other hand where the bile block is due to inflammation, e g cholangitis the enlargement of the liver is relatively slight.

Is there a Swelling of the Spleen or other Abdominal Swelling? Ordinary cirrhosis of the liver while accompanied by splenic enlargement, is unassociated with jaundice On the other hand biliary cirrhosis presents both. Acholuric jaundice is also associated with a big spleen, which varies from time to time especially with the recurrent exacerbations of the acquired type The presence of any other abdominal swelling, in association with jaundice strongly suggests the possibility of malignant disease either the primary focus or a secondary deposit. In such cases the jaundice may be due to secondaries in the liver when it is usually light, or affected glands in the portal fissure when it is likely to be dark.

Very occasionally abdominal tuberculosis with enlarged glands in the fissure may be responsible

Should any swelling be detected, it should be routinely and fully investigated, viz. consistency surface edge and relations as only in this way is its nature likely to be made out.

Percussion

This gives more detailed information about the size of the liver as the organ, which may not appear enlarged on palpation, may have increased by pushing up the diaphragm rather than by projecting into the abdomen. The localisation of the swelling will also be made out, i.e whether it is diffuse or not.

As a rule the surgical jaundices are associated with enlargement of the liver if any change is observed but, e.g. in acholuric jaundice there is no increase in its size and it is unlikely to be noticeable in transient jaundice Diminution of the size of the liver on the other hand, is much more likely to be medical than surgical.

The relation of any tumour that may be present, to the gut may be of importance and should be noted

The presence of free peritoneal fluid may be demonstrated by shifting dullness or ballottement Both require a very considerable amount of fluid in order to obtain a definite result Ballottement requires, in addition to the free fluid something solid to ballotte against and in the cases under discussion the enlarged liver is the commonest or peritoneal deposits In biliary cirrhosis no ballottement is obtained unless the liver and the spleen are enlarged sufficiently to be available

While ballottement in a male nearly always means malignant disease in a female the commonest cause is pregnancy In trying to elicit it the important point is to tap quickly and suddenly and fairly deeply In testing for shifting dullness, it is important to give the fluid time to gravitate from one situation to another

Jaundice with free fluid suggests malignant disease or biliary cirrhosis

SPECIAL EXAMINATION

Rectal Examination In the presence of jaundice a mass in the pouch of Douglas is strongly suggestive of secondary malignant deposits, but a primary malignant focus in the rectum, the prostate or even in the bowel outside the rectum, may be discovered When secondaries in the pouch are well advanced they give rise to what is sometimes described as the rectal shelf The depth of the jaundice in these cases will suggest whether it is due to secondaries in the liver or to a block of the common or common hepatic duct by glands, etc

Blood The icteric index or its equivalent is one of the most important tests for the degree of jaundice present It begins to rise before there is obvious jaundice and when the jaundice is deep and dark it may continue to increase although there is no obvious change to the eye In secondary malignant livers there is frequently a rise to double the normal without apparent jaundice and this is an excellent clinical aid in a doubtful case

A repeated test gives excellent information about the progress of the case e g in a carcinoma of the pancreas it steadily and progressively rises, whereas in a chronic pancreatitis it may remain steady fluctuate or even become normal at times It also gives assistance in regard to the risk of operative interference The risk is always considerable in a chronic jaundice with a rising icteric index whereas a falling one gives a much better outlook with diminishing risk It is also an excellent gauge of any improvement that occurs

Red Blood Cells Surgically the important feature here is the fragility of the red blood cells It is increased in acholuric jaundice and while it is not altered by a splenectomy the condition is relieved The presence of gall stones is a complication

White Blood Cells A total and a differential count should be carried out for information about infection and, if positive the type of organism

involved An eosinophilia suggests hydatid disease, but it has to be remembered that all the worm infestations may produce it

Wassermann Test Reaction This may be very important because here as elsewhere, syphilis may mimic any disease and especially carcinoma The difference between a gummatous and a carcinomatous liver is that between life and death and they may be indistinguishable clinically The gummatous liver may be either diffusely or locally enlarged

Sedimentation Rate This is of value chiefly in relation to the general condition of the patient, i e, whether his jaundice is a serious one or not

Van den Bergh Reaction While latterly the value of this reaction as originally claimed, has been called in question it is safe to regard a prompt and marked direct positive result as diagnostic of obstructive jaundice and therefore, indicative of operative treatment

Prothrombin Coagulation Time This is important from the point of view of haemorrhage, as a result of impaired liver function The adminis tration of vitamin K with bile salts corrects the deficiency

Urea The blood urea is likely to be increased in chronic jaundice and it may reach a very high figure It is a very serious prognostic sign. It is probably associated with the increased B M R and the interference with excretory function accompanying a general break up

Stool The absence of bile in the stool indicates a complete obstructive jaundice and a surgical condition The presence of bile in the stool indicates the absence of complete obstruction and covers the medical cases of jaundice together with those very transient obstructive ones and those due to infection and inflammation on the surgical side

Pancreatic disturbance may or may not accompany the jaundice The chief surgical pancreatic complication is a block of the pancreatic duct The absence of pancreatic digestion leads to the presence of azotorrhoea (undigested muscle fibres in the stool) as well as steatorrhoea the latter showing a marked preponderance *of unsplit or neutral fat, instead of* the fatty acids produced by pancreatic action The presence of a pan creatic block indicates an obstruction low down in the common bile duct e g the head of pancreas or the ampulla of Vater, while the absence of pancreatic block indicates a high biliary obstruction, e g malignant glands in the porta hepatis blocking the common hepatic duct This has a considerable bearing on the outlook Sugar control by the internal secretion of the pancreas may be interfered with and this is more likely to occur in medical than surgical cases It is also more likely to be met in chronic pancreatitis (which may block the common duct) than in carcinoma of the head of the pancreas With chronic obstructive jaundice if the patient eats there is always an abnormally large stool, but it is very greatly increased by an associated pancreatic block

Dysenteric infection may have to be excluded in a case of jaundice

and amoebae may be found in active or resting forms In amoebic hepatitis and abscess jaundice is usually light, if it be present

Skin The hydatid skin test may be of value and, when positive, it is conclusive evidence of the cause of the jaundice It is well to keep in mind that hydatids may cause jaundice in a variety of ways Mostly, jaundice results from pressure on the larger ducts and it is usually a light and partial one

Infection with suppuration, gives rise to a rapidly increasing size of the cyst together with surrounding hepatitis and this is commonly accompanied by jaundice, again of a light nature In a certain small proportion of cases the hydatid ruptures into the bigger ducts and the daughter cysts may block the common duct on their way to the duodenum The attacks produced are identical with those due to primary common duct stones, and with the jaundice there is a distended gall bladder The severity of the pain during the attack helps to differentiate the case from one of carcinoma of the head of the pancreas As the case progresses the jaundice is seen not to be permanent or progressive, and the daughter cysts may be recovered from the stool

Liver Function Tests So far these have proved, for the most part, eminently unsatisfactory, except as of academic interest The hepatic reserve is so great that by the time the tests demonstrate liver incompetence, the patient is obviously more or less moribund The important surgical interpretation therefore of these tests is that a normal liver function result does not exclude serious hepatic disease

Duodenal Tube The duoedenal tube is much more used by the physicians than the surgeons both for the purpose of diagnosis and treatment It may give useful information Whether bile is reaching the duodenum or not can be verified, and both gall bladder and hepatic bile may be collected separately for investigation The results may help to demonstrate infection and functional interference and also their situation

Radiography A straight X ray film may demonstrate a stone or other pathology, e g calcification of an hyadtid A barium meal may reveal a primary malignant focus in the gastro intestinal tract or suggest a carcinoma of the head of the pancreas by widening of the duodenal loop

Unfortunately a cholecystogram cannot be obtained, as interference with the liver function prevents an adequate elimination of the dye Consequently one must wait for the jaundice to pass off before the chole cystogram is attempted

SCHEME XXI

LUNG CONDITIONS SPECIAL FEATURES

Until within recent years chest conditions apart from injuries and with the exception of empyema were and remained under the control of the physicians While empyema continues to be treated mostly by the surgeons tuberculosis in some of its aspects also calls for surgical attention especially in relation to collapse therapy to give local rest e g division of adhesions and thoracoplasty constituting the greater number of surgical interventions Other important pathological conditions which have passed to the surgeon are bronchiectasis lung abscess and tumours, of which carcinoma is the most important

Some preliminary remarks on the tumours may be of value before proceeding to the discussion on note taking So far as simple tumours are concerned they produce symptoms almost entirely mechanically i e by pressure and usually therefore must attain a considerable size before doing so Consequently most of them are clinically silent and are found in the course of routine radiological examination Secondary infection, as a complication is likely to precipitate the onset of symptoms

In malignant tumours the symptoms depend upon their size and situation and infiltration plays a much greater part than simple pressure as in the non malignant swellings The symptoms naturally vary with the structures involved e g bronchi, pleura veins cardiac base and nerves More frequently than in the simple tumours secondary infection is likely to play a prominent part and the symptoms often commence with the occurrence of the infection

Two clinically distinct types of carcinoma of the lung are recognized viz the peripheral and the hilar types The clinical difference is important in so far as the peripheral carcinoma is much less likely to give rise to symptoms than the hilar Peripheral growths represent 25 per cent of the cases while the remaining 75 per cent tend to involve the big bronchi and their main branches The peripheral carcinomas on the whole are more malignant According to Broder s classification only 20 per cent belong to grade I whereas in the hilar type 50 per cent are grade I The more malignant the carcinoma the more likely we are to get metastases but in spite of this because the peripheral ones are so far from the hilum they are less likely to give them Hilar growths are much more likely to be inoperable on account of the local infiltration which is

apt to be diffuse even without glandular involvement The peripheral growths remain localised and removeable for a considerable time

In connection with both, *their first indication may arise from secondaries* If they neither block a bronchus nor irritate the parietal pleura, they may be absolutely quiet

One of the common *things that first draws the attention is pleural effusion*, due to secondaries in the pleura A pleurisy, with its attendant pain may arise from growths projecting on the surface particularly in the peripheral type

In addition to these local secondaries, others may appear widely distributed e g brain ribs and other bones, etc

HISTORY PRESENT CONDITION

Onset

It is essential to remember that the onset of lung conditions, whether *inflammatory or malignant may be purely of a general nature* without reference to the chest and the disease may only be discovered on routine investigation especially radiography Since the symptoms in chest cases *depend mainly on involvement of the bronchi and the parietal pleura* should these structures not be affected the condition remains silent e g in an interlobar pleurisy even when pus has formed there may be *nothing to indicate its presence, as no parietal pleura is affected* The same applies to a lung abscess in its early stage where it is deep in the lung tissue In both the patient may present as a case of inflammatory fever usually with a high leucocyte count *suggesting pyogenic infection* and probably pus and the absence of any localising symptoms suggests *the chest as one of the more likely situations for it In the same way, it* may be the development of cachexia and loss of weight that may attract attention in a carcinoma and there may be nothing to indicate the chest

Whether the Onset was Sudden or Gradual? In the case of the bronchi the same holds good as for any other hollow muscular system viz that a sudden onset suggests a mechanical block, e g by a foreign body, while a gradual onset suggests an inflammatory or malignant cause

In the same way with the parietal pleura a sudden onset without warning indicates a suddenly acting cause of mechanical type e g an embolus producing a sudden peripheral infarct while a gradual onset suggests a more slowly developing condition, such as an inflam matory or malignant focus

With the exception of foreign body impaction most of the sudden or rapidly developing primary chest conditions are medical in nature while the surgical ones are gradual in onset and slowly developing Apparent exceptions would seem to be empyema and lung abscess

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which is usually felt behind the sternum and may be influenced by extension of the pathology

Severity of the Pain This depends on the tissue involved and the acuteness of the condition Involvement of the parietal pleura is much more painful than that of the lung and hilar tissues, and in both situations it is likely to be more severe the more acute and rapidly developing the pathology

Consider *bronchiectasis* *lung abscess* and *neoplasms* in relation to pain. In bronchiectasis pain is absent unless complications are present, and these are especially lung abscess and pleurisy, both usually meaning a light up of the infection present The pleurisy is the more likely to give severe pain and this depends upon extension to the lung surface and irritation of the parietal pleura

In lung abscess, pain is usually an early development and is an outstanding feature of the case This applies to an acute abscess, since the chronic ones e g, tuberculosis are likely to be painless An acute pneumonitis is present, as a rule, with involvement of the overlying pleura, and the same pleuritic pain is produced as usual As the abscess develops and becomes more localised, with absorption of the surrounding exudate, the pain settles down and disappears The pain may be localised or diffuse, according to the pathology, and it may be acute or dull according to the involvement of the parietal pleura and infiltration of tissue, especially where adhesions are already present

In simple tumours no pain is experienced

In carcinoma of the lung on the other hand, more than 80 per cent have pain though it is a late development It is frequently initiated by exertion or more importantly by infection and inflammation following blocking of the bronchi It is commonly intermittent at first but as the disease progresses it becomes more and more persistent and continuous The pain may be due to local infiltration, the malignant being aggravated by the inflammatory, and such pain is likely to be a localised one, more or less at the site of the growth

Especially in those infiltrating the hilar structures, pain may in addition radiate down the arm particularly, but it may also be referred to the abdomen or the tip of the shoulder, depending on the situation of the growth and its extension.

Cough

Time of Occurrence? The morning cough is characteristic of retained secretion e g chronic bronchitis From the surgical point of view it is typical of bronchiectasis lung abscess and broncho pleural fistula with an interlobar empyema Should a cavity be evacuated and secretion be not profuse, there may be relief for a considerable time, but this is unlikely in severe cases of chronic bronchitis and those of bronchiec-

but both may be regarded as secondary to some primary condition, and a by no means necessary sequence of it

Was the Onset with or without Pain? Pain with the onset, especially if severe, is more likely to accompany the acute conditions, which are mostly medical, whereas in the surgical cases it is more likely to be a late development and the onset to present other features In some cases, where obstruction or infiltration may cause a certain amount of pain, the condition may have been missed until its occurrence

Has it followed any previous Lung condition? Most of the surgical conditions follow previous lung pathology The more acute ones, e g, empyema and lung abscess, usually follow pneumonia, either diffuse or localised, or may represent complications of bronchiectasis or malig nant disease On the other hand, bronchiectasis is nearly always secondary, e g, to foreign body impaction, pneumonia, inspiration of septic discharge or blood in operations on the nasal passages, etc Malignant disease, as usual, is likely to give no previous history of chest trouble Hence, with the exception of neoplasms, most of the primary lung conditions are medical particularly the infective ones

Pain

This is important, but it does not play so generally an outstanding part as in many other conditions It may be entirely absent from start to finish and in many cases its appearance heralds the development of complications This absence of pain so commonly seen is often almost certainly responsible for the patient's failure to appreciate the seriousness of his condition e g, in tuberculosis, bronchiectasis etc Pain is by far the commonest symptom to bring a patient to the doctor and, if it is severe it is very frightening to most people The number of patients with malig nant disease in all situations is quite large who, because of the absence of pain find it unbelievable that the condition can be serious and put off seeing their medical attendant until it is inoperable

Whether it Precedes or Follows other Manifestations? If pain precedes the other manifestations, the case is more likely to be medical than surgical In the surgical cases, on the other hand which are mostly of a more chronic nature pain is likely to be a later development and, therefore, to follow other symptoms

Character of the Pain This depends on the situation of the focus of disease, and the structures involved With involvement of the parietal pleura, whether by irritation or infiltration the typical lancinating serous cavity pain is experienced This is more common and more severe as a rule in the inflammatory conditions The pain of infiltration however, whether inflammatory or malignant of the tissues, particularly in the hilar region gives rise to a more persistent boring aching type of pain,

this stage will be the rusty sputum of the surrounding pneumonia but it is not usually marked Cough with frothy sputum may succeed this when the inflammation leads to catarrh in the bronchi Finally when the abscess bursts pus is coughed up and there is usually some haemorrhage with it just as in any acute abscess The blood is likely to be small in amount and mixed with the pus Later if drainage is free postural cough and sputum may develop and at this stage also secondary infection is likely to occur and secondary haemorrhages may follow, which are not as a rule profuse

In simple tumours there are commonly no symptoms but pressure may lead to an irritative spasmodic cough especially if it is situated in the region of the hilum It may even give rise to asthmatic attacks The cough is not productive It may result from exertion The same remarks apply to dermoids and hydatids Especially with the occurrence of secondary infection the cough may become productive, and haemorrhage is a not uncommon accompaniment This may lead to a tentative mistaken diagnosis of tuberculosis

In malignant tumours until secondary infection occurs cough which may occur early, is due to irritation from pressure and infiltration chiefly in the hilar region It is apt to be persistent and non productive With ulceration and secondary infection however blood stained purulent sputum may be produced and secondary haemorrhages are also likely to occur though they are not as a rule large ones Extension may lead to diaphragmatic or parietal pleural irritation and further cough

SPUTUM

Amount This varies very greatly There may be none at all or ounces may be coughed up during the day in a case of bronchiectasis The bronchiectasis cases without sputum are not usually seen by the surgeon The typical postural production of sputum is present in these cases with the largest amount in the early morning on rising and this helps to differentiate it from the profuse continuous sputum of chronic bronchitis and tuberculosis

In broncho pleural fistulae with localised empyemata while there may be a history of postural cough and expectoration there is a greater likelihood of an intermittent production of large quantities of purulent sputum with periods which may be entirely free In most lung abscesses unless they are associated with bronchiectasis the amount of sputum is not large

Character The watery sputum of bronchial catarrh compares exactly with the exudate seen in catarrh of any of the mucous lined hollow muscular systems It is often a preliminary sputum occurring in the early stages of infections It is likely to be succeeded by the development

tasis with a profuse secretion Except in cases such as this a continuous cough is more likely to be medical than surgical the commonest example being tuberculosis of the lung

Spasmodic or Persistent? A spasmodic cough suggests irritation of the hilum or bronchi e g due to pressure or infiltration inflammatory or neoplastic The physicians meet it in aneurysms A persistent cough suggests persistent sputum, e g , in chronic bronchitis or tuberculosis

Postural or Not? A postural cough usually depends on the presence of a cavity with overflow e g a bronchiectasis of one base or a broncho pleural fistula with an empyema While the patient lies on the affected side he rests quietly, but if he turns on to the other side, the overflow of sputum into the bronchi sets up irritation and so gives rise to cough It is in consequence, of special surgical importance while the non postural cough is not so definitely of surgical significance and is much more likely to be medical

Is there Sputum or Not? The common event is to have sputum with a cough and this applies to both medical and surgical cases but the absence of sputum suggests an extra bronchial irritation e g tumours or glands in the hilum or aneurysm It is likely to be of surgical import ance In such cases sputum may remain absent or it may appear late in the condition with obstruction or catarrh

With or Without Haemorrhage? Haemorrhage varies very greatly in its occurrence its nature and its cause

In acute inflammation it may be part of the haemorrhagic exudate e g the rusty sputum of pneumonia

It may be due to secondary haemorrhage the result of superadded sepsis in chronic inflammatory conditions such as tuberculosis or bron chiectasis secondary infection of new growths and allied conditions It may also result from congestion in the severe spasmodic attacks of coughing of irritative lesions Haemorrhage may therefore occur in almost any lung lesion

Consider coughing in relation to bronchiectasis lung abscess and tumours

In bronchiectasis coughing is usually a prominent feature It may be a dry irritative cough without sputum and this is of particular import ance as it is unnecessary to operate on such cases Unfortunately this type is not common In the average case there is a persistent cough with profuse foetid sputum with the typical postural element present Hae morrhages may occur and be repeated and these are of the nature of secondary haemorrhages and as a rule are not large

In the case of a lung abscess if the pathology be kept in mind, neither cough nor sputum need appear at the start if the focus is central and localised On the other hand the nearer the focus is to a bronchus the more likely is there to be an early irritative cough Sputum if present at

In the early stages of abscess there may be a minor degree of haemorrhage without any sputum

Amount This depends on the pathology and usually on the size of the vessel opened

In most of the surgical cases the bleeding is not profuse as the pathology is against it

In acute abscess the bleeding is of the type seen in pneumonia producing rusty sputum

In chronic pyogenic abscess the thickened fibrous tissue round the cavity leads to a diminished vascularity and so the bleeding is not great

In bronchiectasis a similar chronic inflammatory condition holds and the haemorrhage is as a rule, small

In tuberculosis there is usually destruction of tissue without fibrosis Secondary infection is liable to increase the destruction greatly and in consequence large vessels may be eroded with profuse haemorrhage

In tumours vascularity is ordinarily not great and it is the tumour itself which bleeds The bleeding is not great in amount in such circumstances

In hydatid bleeding takes place from the wall of the bronchus destroyed by pressure The bleeding is not usually excessive but it may be

A foreign body may perforate a big vessel and lead to severe haemorrhage but this is not usually the case

One may say, therefore, that a profuse haemoptysis is much more likely to be medical rather than surgical

Frequency of the Haemorrhage The more active the lesion the more frequently may bleeding be anticipated

Sepsis, often secondary, is also a most potent cause of repeated bleeding the pathology being essentially that associated with secondary haemorrhage It is the most important factor in the haemorrhages of tuberculosis which, if uncomplicated by pyogenic infection is commonly a relatively mild disease, and unassociated with the gross destruction which accompanies the mixed infection

In bronchiectasis haemorrhage may occur in both the dry and wet types though it is much commoner in those with profuse foetid sputum Those without sputum are especially important as they are commonly treated as cases of tuberculosis

In lung abscess haemorrhage is frequent but not severe as a rule If the abscess extends it tends to be repeated If it has free drainage it tends to settle down to a chronic inflammatory condition and bleeding diminishes and tends to produce quite small repetitions

In tumours whether simple or malignant, repeated haemorrhages are likely but usually they are not excessive Occasionally however a big bleeding may occur Usually the surface of the tumour becomes ulcerated and leads to smallish haemorrhages but secondary infection

of muco purulent or even purulent sputum in the more severe infections It may occur with or without ulceration

Rusty sputum represents the haemorrhagic exudate seen in any acute inflammatory condition the blood, in small quantity, being intimately mixed in the discharge

Foetid sputum is characteristic of that produced in cavities of any sort, with stasis and a mixed infection, especially with anaerobic organ isms

In hydatid disease of the lung daughter cysts are not, as a rule pro duced and if the contents of the cyst are coughed up they comprise hooklets and portions of the membrane Usually, an hydatid cyst will not rupture into a bronchus until it has attained a considerable size when it may give rise to enough pressure to cause destruction of the wall As daughter cysts are not usually present in lung hydatids, their presence in the sputum suggests the likelihood of their having come from the liver by rupture through the diaphragm and lung This is not absolute

With infection, a lung hydatid becomes a big abscess cavity, with its corresponding manifestations It may also lead to bronchiectasis later

The presence of bile in the sputum, which may be recognized by the patient from its bitter taste, indicates a biliary fistula extending through the diaphragm and the lung It may arise from the extension and rupture of any liver abscess, whether primary or secondary, e g a suppurating hydatid

The presence of carcinoma cells in the sputum may be of the greatest importance in diagnosis, seeing that 20 per cent of the lung carcinomas are not visible with the bronchoscope Carcinoma cells may be found in 60 per cent of the cases

HAEMORRHAGE

With or Without Cough? The situation of the lesion and the pathology present control the question of the cough and in most cases cough is present and frequently it initiates the bleeding On the other hand, if there is no cough the patient usually does not know whether the blood has come from the chest or has been vomited

It may be necessary to demonstrate the presence of gastric or sputum contents in what is produced

Haemorrhage from a lung without cough is likely to be a big one, and from involvement of a big bronchus and a big vessel

With or Without Sputum? Haemorrhage without sputum may occur in tumours or hydatid cysts, and also in the dry type of bronchiectasis On the other hand the commonest cause of haemoptysis is tuberculosis and here it is customary to have a great deal of sputum The same applies to bronchiectasis, where there is usually copious sputum

given by him, will be the pointer to changes in the pathology seeing that as a rule the pathology *controls the clinical picture*

Often therefore in a carefully taken history progressive destructive changes with collapse of the lung infection bronchiectasis abscess formation or pleurisy are easily *and readily outlined With the progress* of the disease, it is well to remember that many of the lung conditions present referred symptoms e g they are frequently sent into hospital as abdominal cases from *reference of pain along the intercostal nerves* Besides this chest pain is often referred down the arm and in the case of diaphragmatic involvement pain is commonly experienced on the tip of the shoulder

PREVIOUS HISTORY

A history *of previous lung trouble such as pneumonia or whooping* cough is quite often given in cases of chronic lung conditions for which the surgeon is called in A previous operation on the upper air passages is also important *because there is a particular risk of inhaling blood* discharges or foreign bodies such as teeth into the lung As a precautionary measure the number of teeth removed should always be checked *as frequently it is only when the damage is done that the tooth is dis* covered On the other hand if the patient inhales blood or pus septic pneumonia is likely to develop and even if the result is not fatal, persisting *infection is liable to result in lung abscess or bronchiectasis In* the same way the lung may collapse after inhalation of foreign material with subsequent pneumonia and later possibly bronchiectasis

Secondary involvement of the lung to some distant primary focus is not uncommon Septic emboli with infarction and abscess production are an ordinary occurrence

FAMILY HISTORY

Tuberculosis is the chief lung condition which tends to run in families *and as such it is not usually a surgical proposition As the disease is* not an hereditary one this is explained either on the basis of hereditary predisposition or the fact that all members of a family are likely to be equally exposed to bad hygienic *surroundings and the tuberculous infec* tion itself (Figs 296-310)

PHYSICAL EXAMINATION GENERAL

Evidence of *anaemia* loss of weight and cachexia are looked for as indicative of toxaemia and general disturbance Acute conditions are more likely to be medical while chronic ones include *most of the surgical* cases

Temperature and pulse should be noted Inflammatory fever if present is usually representative of the pathology present It is well to keep in

may lead at times to the erosion of big deep vessels with profuse bleeding

The same applies to hydatid disease Haemorrhage may occur and be repeated usually not severe, but in some cases profuse In the absence of sputum it is liable to be regarded as a case of tuberculosis The pressure of the cyst leads to destruction of the wall of an adjacent bronchus and secondary infection commonly supervenes This is likely to be responsible for repeated bleeding

DYSPNOEA

Spasmodic or Continuous? Spasmodic dyspnoea suggests some irritation such as bronchial glands or a hilar lesion while continuous dyspnoea suggests pressure

Dyspnoea on exertion is a feature of tumours and occurs in about two thirds of them

If dyspnoea is present at rest without exertion it suggests a very big tumour or a large collection of fluid A large pleural effusion is often seen in late malignancy but it may occur in simple tumours, from venous obstruction

IS THERE ASSOCIATED INFLAMMATORY FEVER?

The patient is only likely to be aware of fever if it is fairly marked and consequently that usually means a pyogenic infection Such infection may constitute the primary disease as e g in the pneumonia which precedes a lung abscess or it may represent a superadded or secondary infection on some other condition e g tuberculosis bronchiectasis or tumours

During a spreading infection there is a sustained temperature without night sweats but in the presence of pus either shut in as an abscess or pocketed with inadequate drainage the temperature swings and the drops are associated with night sweats This is especially well seen in septic tuberculosis The superaddition of sepsis on some other pathology may prove the cause of a light up and may be responsible for the onset of manifestations

Loss of Weight This is indicative of toxaemia of some sort either inflammatory or malignant and in the latter a secondary infection with inflammation is frequently the main cause of it

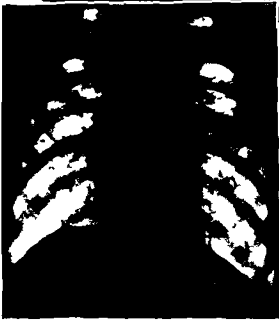
DEVELOPMENT

This covers the whole of the evolution of a pathological process and it may therefore end in cure of the disease or destruction of the patient according to the effect of his reaction on the course of the disease All grades between complete cure and death may be met

When events are retrogressing and they usually are when a patient seeks medical advice the history of changes in the manifestations as







301

Fig 299 X ray photograpn Encysted collection of fluid (inflammatory)

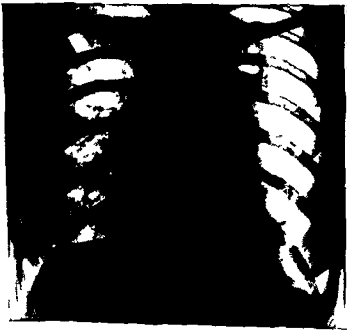
Fig 300 X ray photograph Typical lung abscess with fluid level and surrounding pneumonitis

Fig 301 X ray photograph Balloon or tension tuberculous cavities

Fig 302. X ray photograph Large tuberculous cavity held open by adhesions in spite of pneumothorax

Fig 303 X ray photograph Actinomycosis cavity with fluid level *opposite cardiac apex* with other lung infiltration

302



303



296a





296b



Fig 296 a and b Bronchogram Typical bronchiectasis of right lower lobe A P and lateral views

Fig 297 Bronchogram Bronchiectasis of saccular type.

Fig 298 a and b X ray photograph Interlobar empyema A P and lateral views

297

298a



298b



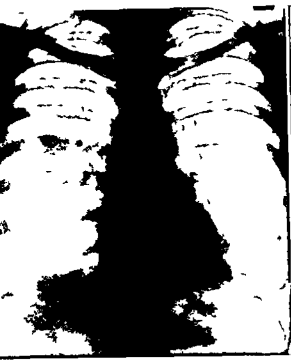


Fig 308 X ray photograph Peripheral carcinoma of the right lung Still very well defined



Fig 309 X ray photograph Right hilar carcinoma with collapse of the middle lobe



310a



310b



310c

Fig 310 *a* *b* and *c* Photographs and X ray Carcinoma of the lung coming through the chest wall by contiguity and continuity



304

Fig 304 X ray photograph Hand of the patient in Fig 303 showing marked hypertrophic pulmonary osteo arthropathy

Fig 305 X ray photograph Cystic lung No fluid levels

Fig 306 X ray photograph Giant congenital cyst of left lung field with displacement of heart to the right



305



306



307

Fig 307 X ray photograph Hydatid cyst of right lower lobe Non infected no surrounding pneumonitis

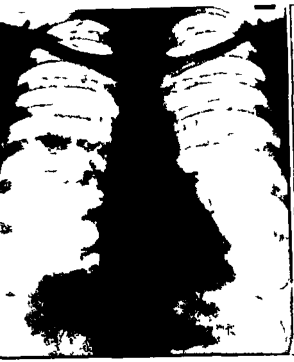


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Fig 309 X ray photograph Right hilar carcinoma with collapse of the middle lobe



310a



310b



310c

Fig 310 *a* *b* and *c* Photographs and X ray Carcinoma of the lung coming through the chest wall by contiguity and continuity

mind that, in tuberculosis, we sometimes meet a cyclic change in temperature, each cycle taking about ten days, and also we find the inverted temperature, the rise taking place in the morning and the fall in the evening Where the patient s general condition is greatly undermined, the pulse is always fast, even if no temperature is present The condition of the upper respiratory passages is of the greatest importance in chest pathology, *as the source of infection frequently is found in the sinuses*, teeth tonsils, larynx etc

In a case of bronchiectasis this may be so important that, should septic sinuses be radically dealt with the bronchiectasis may settle down to a more or less dry type with little or no sputum Radical lung operation may thus be avoided Even where a radical lobectomy has been performed failure to deal with a septic sinus may precipitate a bronchiectasis on the other side

Clubbing of the fingers may be of importance as a sign of chronic sepsis It can develop very quickly and may be well marked in four to six weeks in a case of lung abscess

PHYSICAL EXAMINATION LOCAL

The presence of appropriate local physical signs carries with it the positive diagnosis of the corresponding lung pathology, but the absence of such signs does not preclude the existence of disease in its various forms, and this must always be kept in mind

INSPECTION

Compare both sides of the chest for respiratory movements shape, whether retracted or bulging, localised swellings or flattenings, etc Rigidity of the chest wall with restriction of movement especially in acute cases, is likely to be the result of protective muscular contraction due to the pain of parietal pleural irritation It is exactly the same as the rigidity seen in any of the serous cavities with involvement of the parietal layer, e g in the abdomen the cerebro spinal cavity, the pericardium etc The situation and the extent of the rigidity correspond to those of the irritation

As the surgical cases are as a rule chronic in type disturbances in contour are particularly likely to be seen in them Fluid collections may lead to bulging of intercostal spaces e g, empyema necessitatis fibrosis is likely to produce flattening and retraction

Localised swellings are likely to be surgical e g, a carcinoma of the lung may extend through the chest wall and present as a lump On the other hand, it must be kept in mind that swellings on the chest may have nothing to do with the lungs at all but may come from the ribs or superficial tissues

Palpation

Vocal Fremitus This is usually increased in the presence of solid lung while it is absent in the presence of pleural fluid This, however, does not hold in the presence of adhesions, e g, in loculated fluid collections, the fibrous bands apparently conducting the vibration

Displacement of the Mediastinum The position of the apex beat is the usual indication of this, but it must be known to have been in a different position previous to the present development, e g, a normal apex beat with a big hypertrophied heart suggests displacement to the right, whereas in a normal heart the apex beat would be medial to the usual site with a similar displacement

Tracheal displacement is unlikely to help, as it is not usually demon strable in the neck in intra thoracic conditions In the neck it is com monly seen in thyroid pathology

Abnormal pulsation may indicate an aneurysm or an empyema neces sitatis with transmitted as well as expansile impulse

Should a *localised swelling* be present a routine examination of it must be carried out viz, its consistency surface edge and relations

Percussion

Resonance or dullness must be noted and the degree of either or both

A more tympanitic note than the normal resonance suggests emphy sema or pneumothorax while a dull note is found both with consolidated lung and the presence of pleural fluid The note over fluid is the duller and flatter and a feature that is often noticed is the feeling almost of pain in the percussing finger over it This is not experienced over solid lung

The heart may be found displaced over to the right side of the sternum

Auscultation

Breath Sounds These may or may not be heard Their absence usually means the presence of fluid but a grossly thickened pleura will mask them very much The presence of adhesions with fluid may prevent their complete disappearance and in children as a rule, the breath sound can be heard through fluid In children therefore the dullness is the most important indication of fluid

When breath sounds can be heard, their interpretation may be difficult and it is often wrong The anatomy must be thoroughly well known to avoid error as far as possible, e g bronchial breathing will always be heard over a big bronchus and outside the lung margin over the pleural recess the sounds may be greatly diminished or absent i e, two to three inches above the rib margin

The detailed characters of the breath sounds are dealt with at length

by the physicians but the uncertainty of their interpretation has led the surgeons to rely more on other examinations for exact information e g , radiography, bronchoscopy aspiration, exploration, etc

Vocal Resonance This corresponds to the vocal fremitus With fluid as a rule it is absent but if the amount of fluid be small or adhesions be present, this may not be so Over the margin of the fluid collection where a thin layer only is present, aegophony may be found

Friction Rub This suggests pleurisy, but one must keep in mind that the commonest source of a friction rub is the hair on the chest wall If it is pleuritic, it indicates the site and extent of the pleurisy

A further point of interest is seen in relation to it in an acute pleurisy e g , associated with pneumonia When it comes on at first, it is one of the most painful conditions With the appearance of fluid the pain and rub disappear, and as the fluid is absorbed the friction returns, but this time it is painless The absence of pain is no doubt due to the presence of a thickish coating of fibrin protecting the sensitive parietal pleura This is a good gauge of the stage of the pathology present

Heart Sounds This is chiefly a question of the position of the apex with reference to displacement

SPECIAL EXAMINATION

Sputum A complete examination of the sputum is necessary In addition to a bacteriological investigation much may be learned from the micro scope e g the presence of carcinoma cells hooklets or hydatid mem brane etc Pus, bile, etc may also be demonstrated

Radiography before and after the introduction of lipiodol Different views are essential and sometimes views at different depths may give more detail It may be necessary to investigate each lung separately as to the extent of disease

Similarly the induction of an *artificial pneumothorax* may be helpful as adhesions will prevent collapse and the distribution of the adhesions may be of the utmost importance It often happens that the only part of the lung for which collapse is desired is the only part which does not collapse

In relation to tumours of the lung where similarly to elsewhere great difficulty may be experienced in differentiating between simplicity and early malignancy one may say that a clearly defined outline is strongly in favour of simplicity but may be present in either whereas an ill defined outline is strongly in favour of malignancy the lack of definition being due to infiltration The same may apply to secondary septic infec tion of a simple tumour

Bronchoscopy This is an important accessory investigation A foreign body may be seen and removed A tumour may be seen in the bronchus

or pressing on it from without Mucus and pus can be aspirated, and a snip of a tumour taken for biopsy

Postural Drainage This will often give good information as the presence of a cavity may be demonstrated, as well as its position At the same time, it is of value from a treatment point of view, either as a palliative or pre operative measure

Needling This is chiefly of value in deciding the nature of fluid already diagnosed clinically On the other hand it may be diagnostic in case of doubt The dangers are the usual ones haemorrhage and infection Nothing could be more tragic than the needling of an abscess of the lung or an interlobar empyema where there are no adhesions to the pleura

Thoracoscopy This offers help in certain cases, and a pneumothorax is necessary Adhesions can be seen and divided etc

Exploratory Thoracotomy This is gradually and justifiably coming more and more into vogue, and is of undoubted value in certain cases of doubt and difficulty

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316a 316b 316c 316d



317



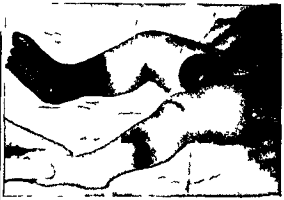
Fig 316*a* *b* *c* and *d* Buerger s disease showing —*a* Tapering fingers (fibrosis) besides ulceration and old scars *b* Ulceration of the nail bed and loss of hair *c* Gangrene of the big toe others shiny and hairless *d* Extensive gangrene of the foot

Fig 317 Simultaneous bilateral gangrene — Raynaud s disease

Fig 318 X ray photograph Advanced calcification of vessels



311



312

Fig 311 Thrombotic gangrene due to arteriosclerosisis Pop liteal occluded

Fig 312 Embolic gangrene A case of pneumonia Meta static involvement of the scrotum Occlusion of pop liteal



313



314a



314b



315

Fig 313 True diabetic gan grene

Fig 314 *a* and *b* Carbolic gangrene due to a 1 20 car bolic compress

Fig 315 Carbolic gangrene due to pure carbolic applica tion

of embolic arrest and thrombosis Both produce pain, but while the embolic arrest leads to a sudden severe spasm of the highest grade and a correspondingly extreme pain, thrombosis, *developing more slowly produces a milder aching pain of the same type,* though it can still be fairly severe

Type This, naturally, depends on its cause In spasm the pain is the same as in spasm in any of the hollow muscular systems *It is as severe* as elsewhere but in addition *it carries with it a strange anxiety and* feeling of impending death, best seen in angina pectoris which is not seen in any other hollow muscular system It radiates like the colics and here the radiation is in the distribution of the affected *vessel* Another feature of it which *is naturally expected, is that we do not meet the* sudden termination and relief that occurs when a gall stone falls back into the gall bladder or passes into the duodenum The embolus or thrombus cannot pass or disimpact and relief occurs gradually by the slow relaxation *of the spastic contraction of the vessel wall round it* and in the adjacent vessels comprising the collateral circulation

In addition to the pain of spasm pain of a different type may be associated with infection This, as elsewhere is more continuous and can be of quite severe *degree Much of the pain in gangrene is from this cause*

Furthermore the interference with tissue metabolism from vascular deficiency leads to the freeing of the products of tissue destruction and these metabolites may also act as irritants and produce some vascular spasm *with pain* possibly *severe, but usually not of* the severity *of that* of embolic arrest

Intermittent or Continuous? Intermittent pain in peripheral vascular disease is much more likely to be due to claudication than to originate *in the vessel itself Any condition of the vessel whether spastic* or organic or both which prevents the increased blood flow necessary for continued muscle action will produce it but it is a muscular pain Intermittent vascular pain, on the other hand is likely to have a considerable *element of spasm about it, as in angina and its equivalent* at the periphery, e g Raynaud s disease

Continuous pain however, is much more likely to be due to local pathology in the vessel or surrounding tissues e g arteritis or phlebitis, *infection and inflammation, neuritis, or metabolite production,* setting up irritation

Distribution This may be localised to the seat of trouble in the vessel most commonly seen in phlebitis though there may be a local pain at the site of embolic arrest *In the latter case, however, the pain of vascular* spasm which accompanies it is so severe as to be likely to overshadow it, and the spasm pain is felt radiating in the distribution of the affected *vessel*

Rest pain is commonly a local *pain and usually superficially* felt

senting the suddenness or acuteness of an embolus, though a similar state is ultimately seen of more gradual development

In embolic arrest a sudden vascular spasm occurs and a special feature of it is that it involves not only the local portion of the affected vessel but the whole of the collateral circulation in the neighbourhood

In phlebitis, also, with thrombosis, the same thing occurs perhaps the whole of the veins of the limb being involved, if not in some cases those of the opposite limb also This modification of the spasm is not seen in the other hollow muscular systems, at all events to the same extent but in the inversion (intussusception) due to polypus we fre quently find several inches of the gut distal to the polyp in intense spasm

This reflex diffuse spasm may be controlled, temporarily at least by vasomotor anaesthesia i e, paravertebral block, and its worst effects avoided The steadily progressive and increasing obstruction of chronic vascular disease usually presents a corresponding steadily increasing picture of the results of obstruction to the circulation (Figs 311 317)

Numbness, as opposed to pain is of sufficient frequency as a symptom of serious vascular interference as to demand its recognition among the more important of the premonitory evidences and it should not be lightly disregarded

Duration

Acute conditions are likely to be of shorter duration than the chronic ones although as in other diseases, the patient s attention may only recently have been attracted to his condition The duration therefore as given by the patient may be misleading but one can rely on the fact that the acute conditions never have a long history while the chronic ones may have any length of story

In the acute conditions the duration of the attack may be of vital importance from the point of view of prognosis and treatment In the case of an embolus unless we are called in within three or four hours the chances of being able to help materially are about nil and even with thrombosis the relief of spasm to be of much value, must be achieved within the first few hours Otherwise the benefit to be expected is likely to be very problematical

Pain

Present or Not? In vascular as well as other disease pain varies very considerably and all grades are felt It may be simply a question of dis comfort or one of the most severe pain and one has always to keep in mind the varying pain threshold in different individuals The acute conditions are much more constantly associated with pain than the chronic slowly developing ones

Severity Reference has already been made to the contrast in the pain

strongly favours organic vascular disease whereas intermittency favours a functional or spastic element though organic disease may or may not be present as well Where the condition is continuous there may be evidence of its improving of its being stationary or of its becoming progressively worse

In Buerger s disease, which is not *per se* a killing disease, there is a tendency for it to run its course and then to become stationary and finally to improve This depends on the development of the collateral circulation and the reopening of thrombosed vessels It is unlikely to happen in other forms of advanced organic vascular disease Unfortunately *the improvement may only be temporary and a recrudescence of* the disease or repeated thrombosis of the vessels may take place On the other hand e g in atheromatous conditions as a rule, the condition is likely to become progressively worse There may be a complaint of progressive coldness or increasing claudication with shorter and shorter walks or both may be present This has an important bearing on the prognosis and in any case it means an advance of the disease

As in considerable measure, the muscle and skin circulation is independent the complaint of increasing coldness is the more serious from the point of view of possible gangrene though usually the patient is more worried about the claudication If both are increasing it means the whole of the limb circulation is involved and the outlook correspondingly bad

If the condition is intermittent the spastic element is responsible for a part or the whole of it, e g , Raynaud's disease The state of things between the attacks has the same significance here as in the other hollow muscular systems

If we are dealing with an entirely spastic condition, a purely mechanical effect is produced the patient has no complaint between the attacks On the other hand if there is underlying organic disease the patient does not return to the normal level between attacks, the residual disability depending on the degree of permanent organic trouble This corresponds exactly to gall stones with or without associated infection and inflammation

In Raynaud s disease especially in the earlier years 95 per cent of the condition is due to spasm and vascular compensation easily results in the patient having no subjective symptoms between the attacks At the same time we know that there is some organic disease present in such cases though possibly of minor degree

In Buerger s disease in the early stages spasm plays a large part, and the condition between the attacks of disturbance approaches the normal if it does not reach it Even at this stage some of the characteristic redness may remain In the later stages however, the organic plays an increasingly important part, and consequently between the attacks of more severe manifestations the condition never approaches at all closely to the normal

It is ordinarily the result of local infection and inflammation, with in adequate blood supply and metabolite irritation

Relation to Exercise and Rest Relation to exercise is mainly a question of muscle action the inability of the vascular supply to increase on demand, leading to claudication The muscle tires but if it is free to go on acting liberated metabolites by their irritation cause cramps It is more commonly seen in organic vascular disease, than in purely spastic conditions, but is frequently precipitated or aggravated by additional spasm

Rest pain, as mentioned above, is due to local pathology, e g , infection neuritis, or metabolite irritation

Relation to Temperature Changes In the presence of gross ischaemia especially due to organic vascular disease the advent of heat increases metabolism without adequately increasing the blood supply the meta bolic products setting up irritation and pain Many patients with threat ened gangrene keep their feet exposed outside the bed clothes for this reason In the milder spastic ischaemias heat relieves the situation as opposed to the case of organic obstruction but, in the grossest cases of spasm, e g frost bite, too sudden a relief of spasm by heat may lead to an excessive dilatation and intense pain In erythermalgia (eryth romelalgia) pain occurs at the critical temperature level usually 32°C, and not below that

Relation to Posture In Buerger s disease, with diffuse arteritis and frequently associated phlebitis the pain is relieved by dependency and the patient therefore habitually keeps his feet hanging over the side of the bed In erythermalgia on the other hand pain is increased by de pendency

Is Sensation Altered? Very often complaints are made of altered sensa tions in the affected part e g heat cold tingling numbness etc These usually have a purely vascular origin e g the coldness of ischaemia or the heat of hyperaemia (erythermalgia) but they may be due to nerve involvement as in the peripheral neuritis of diabetics and alcoholics In these any of the paraesthesias may be experienced from hyperaes thesia to anaesthesia

Muscles—Cramps with or without Exercise When cramps develop with exercise intermittent claudication results cessation of exercise leading to cessation of the cramps This is simply the result of a quantita tive inadequacy of blood to meet the increased demand The cramp is usually preceded by a feeling of fatigue in the muscles

On the other hand many of these patients get cramps while they are lying at rest in bed This is a different condition altogether and depends upon the local disease e g diabetes often with an associated peripheral neuritis It is probably an irritative lesion with reflex spasm occurring

Condition Continuous or Intermittent Continuity of the condition

strongly favours organic vascular disease, whereas intermittency favours a *functional* or spastic element, though organic disease *may* or *may not* be *present* as well. Where the condition is continuous, there *may* be evidence *of its improving* of its being stationary or *of its becoming progressively* worse.

In Buerger's disease, which is not *per se* a killing disease, there is a tendency for it to run its course and then to become stationary and finally to improve. This depends on the development of the collateral circulation and the reopening of thrombosed vessels. It is unlikely to happen in other forms of advanced organic vascular disease. Unfortunately the improvement may only be temporary and a recrudescence of the disease or repeated thrombosis of the vessels may take place. On the other hand, e.g., in atheromatous conditions as a rule the condition is likely to become progressively worse. There may be a complaint of progressive coldness or increasing claudication with shorter and shorter walks or both may be present. This has an important bearing on the prognosis and in any case it means an advance of the disease.

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Change in Colour A change of colour of the extremities is very often noted by the patient and recorded in the history

Primary arterial disease often gives rise to pallor especially on exercise (Goldflam s sign)

In Buerger s disease there is commonly a congested bluish red appear ance with shiny skin and loss of hair In erythermalgia and acrocyanosis as these descriptive terms indicate, there is redness and cyanosis respec tively

PREVIOUS HISTORY

There may be a history of some underlying casual factor, e g diabetes, senility, syphilis, ergotism cervical rib cold cardiac conditions, especi ally in relation to embolism, and also polycythaemia

Previous Attacks in the Same or Other Limb The occurrence of such attacks suggests a general condition which may be spastic or organic, or both This applies, e g to Raynaud s disease, Buerger s disease endarteritis and atheroma In most of the peripheral vascular conditions it is customary to find one limb more affected than the other

Whether the Patient is a Smoker and, if so to what extent? This is par ticularly important in relation to the spastic element in these cases and it may play a prominent part either as a predisposing or aggravating factor It is the rarest thing to meet a case of Buerger s disease in a non smoker, though it does occur On the other hand if a patient with Buerger s disease will not give up smoking, treatment is likely to be of little avail

History of other Vascular Disease Phlebitis is of special importance as it is frequently among the earliest manifestations e g of Buerger s disease Here it is of the migrating type, appearing anywhere though mainly in the limbs both upper and lower It commonly involves the smaller superficial veins

Exposure to cold and frost bite may have been experienced

PHYSICAL EXAMINATION GENERAL

This includes a general examination of the cardio vascular system, e g the condition of the heart and arteries the blood pressure, etc In these cases as a rule by the time we see them the disease is well advanced as the compensatory vascular mechanism adjusts local conditions for a long time so that the patient fails to recognize any serious symptoms

In many of the patients suffering from vascular disease especially Buerger s disease the patient presents the same facial appearance as in angina pectoris i e a strained half scared frightened anxious look which is very characteristic It is usually accompanied by severe vascular pain as opposed to the pain of local pathology e g infection inflamma tion Other facial characters which may also be seen are (*a*) the plum colour of polycythaemia (*b*) the expressionless face lacking natural

creases with puckered mouth, in advanced Raynaud's syndrome with scleroderma (c) xanthalasma palpebrarum, due to disturbed fat and cholesterol metabolism, also suggesting diabetes All these have an important bearing as ergotamine should never be given to patients who have existing vascular disease

The presence of other conditions associated or not, e g., diabetes septic foci etc should also be looked for

PHYSICAL EXAMINATION LOCAL

Inspection

The evidences of vascular disturbance are usually obvious and varied, e g pallor (anaemia) arterial or venous hyperaemia (redness or cyanosis) oedema and varicose veins Pallor from anaemia is commonly the result of arterial obstruction but it may be due to a too rapid venous drainage e g in elevation of the part or the result of exercise in the presence of ischaemia In embolic arrest it is well to remember that the pallor is much more extensive than the site of the arrest would suggest, and it is due to the spasm involving the collateral circulation In thrombosis at the same site the pallor is not nearly so marked Intermittent pallor is indicative of spasm as opposed to organic disease though they may be combined e g Raynaud's disease Cyanosis is met in all sorts of conditions The commonest is the ordinary venous stasis of varicose veins or debility While venous stasis is essentially associated with a cold limb, it is well to keep in mind that in the presence of a vascular balance, venous congestion is associated with a hot limb

In erythermalgia we have redness with a hot limb while in acrocyanosis we have a cold limb with cyanosis

In Buerger's disease cyanosis is present in the dependent limb but it disappears with elevation In erythermalgia, on the other hand the redness persists with elevation

In arterio venous fistula which gives rise to a marked venous congestion and a permanent increase in blood supply the cyanosis is accompanied by big veins and the local heat is increased

Oedema may be the result of vascular or lymphatic interference In vascular disturbance it is most commonly due to venous block but it is also frequently seen as the result of an inflammatory exudate In Buerger's disease the oedema is probably due to increased permeability of the damaged vessel walls and it can usually be got rid of by hypertonic saline injections

In lymphatic oedema we are not necessarily dealing with vascular disease

Evidence of the Results of Vascular Interference These are the same as are seen in inflammation and are apparent only when organic changes

have occurred in other words, nothing abnormal can be detected if the affected tissue completely recovers (resolution) As usual, the results depend on the degree and duration of the vascular interference and they may be fibrosis, molecular destruction (ulceration), or molar (massive) destruction (gangrene) All of these changes may be seen in functional disturbance (spasm) or in organic disease of the vessels

In Raynaud s disease it is quite common to see tapering of the fingers which become conical This is due to fibrosis in the soft tissues The pulp which is a very sensitive part of the finger, has its sensitivity decreased In a marked case the whole finger may be thinned and atrophic looking with shiny skin The trophic changes are purely vascular and are not due to nerve involvement In more severe vascular interference ulcers or even gangrene may occur Where the main vascular supply of the limb is affected, the tendency is for all these changes to be terminal In a young patient with diabetes where the chief brunt of the endarteritic changes involves the smaller arteries, the distribution of the tissue changes is not terminal, but occurs in those areas where the vessels are diseased most, e g the dorsum or the sole of the foot

Other Signs of Vascular Interference Purpuric changes may occur where the vessel walls are abnormally permeable

Pigmentation and scleroderma may both be associated with Raynaud s phenomenon Scleroderma includes both a lymphatic oedema and a fibrosis which is probably due to the oedema interfering with the vascu larity and therefore, secondary to it Marked atrophy and wasting may occur proximal to the fingers and toes It is usually associated with loss of hair the skin itself being thin and shiny This is particularly seen in Buerger s disease

On the other hand, in arterio venous fistula, hypertrophy of the affected part is likely to develop and this may involve a whole limb producing a so called hemi hypertrophy It is due to the gross hyperaemia

Comparable to the loss of hair, the nails may cease to grow, and it is a not infrequent event to find flat feet developing and constituting the patient s complaint In such cases it is imperative not to miss the under lying pathology

PALPATION

Skin Temperature There are considerable variations in skin temperature in different persons which may still be regarded as within normal limits Care must therefore be exercised in assessing it. It is important to compare not only different parts of the limb but also both limbs In the normal individual the temperature is the same in both In vascular disease one limb is usually affected more than the other and if there is a dif ference in the two sides that with the lower temperature is the more advanced

Simultaneous bilateral gangrene is quite rare, though it may be seen in Raynaud s disease

Fibrosis and scleroderma may be present, varying in distribution, but controlled by the degree of vascular interference in the different regions

Diffuse nodular thickening of the skin is frequent in scleroderma, associated with lymphatic obstruction On the other hand, individual nodules are not unusual and are associated with calcinosis, i e a deposit of calcium salts in the skin It indicates a further change, i e, there is some degeneration of tissue, with a condition just short of ulceration, in fact, in some cases ulceration of the nodules occurs It is chiefly seen in cases with marked Raynaud s phenomenon

Condition of the Main Vessels of the Part This is very important and changes are especially marked in the more advanced cases of disease although it is one of the grosser methods of gauging it Thickening of the arterial wall may be present a long time without serious consequences, and calcification is a very late occurrence When it is present the vessel feels nodular and hard whereas short of calcification, the vessel wall feels firm and thickened but is still more or less smooth and elastic

Pulsation may be very difficult to be certain of especially in the presence of scleroderma or oedema It is important not to mistake one s own pulse for that of the patient, and a useful help is that if the pulse cannot be counted it is not the pulse that is being felt Frequently tendon contractions and other movements may give a wrong impression of pulsation Even when it can be counted it is well to compare it with other pulses of the patient and perhaps one s own Having felt the pulse, its usual features must be noted

A *thrill* is a very uncommon finding but it is sometimes felt in diseased vessels, e g in the femoral in Buerger s disease It may indicate an arterio venous fistula

A *thrombosed vessel* is often readily felt especially a vein, as it is more likely to be superficial and still to be of some size It is one of the commonest accompaniments of Buerger s disease and it is not limited to the main part affected, but is fleeting and widely distributed It is, therefore unlike that seen in varicose veins, which are commonly limited to the lower limbs Indeed, the so called migrating phlebitis strongly favours the diagnosis of Buerger s disease (Goetz) Both arteries and veins may ultimately be affected

Condition of the Capillary Circulation This is usually interfered with in vascular disease whether arterial or venous In heart failure from any cause whether primarily cardiac or secondary to toxaemia, e g, diffuse peritonitis, the capillary circulation may be grossly impaired and in severe cases is almost completely arrested

In arterial disease there is decreased flow of blood to the capillaries, whereas in venous disease there is impaired drainage with stasis

In testing the capillary circulation e g by pressure on the nail bed great care has to be taken to differentiate a rapid filling by back pressure from the venous side from that occurring from the arterial flow Other wise one may be grossly misled

Whereas *peripheral vascular disease of the lower limb is almost* exclusively part of a generalised disease this may not be so in the upper limb where local conditions may be responsible A cervical rib, which may be uni or bi lateral may cause gross interference with the vascular supply of one or both limbs The rib can usually be felt in the supra clavicular fossa

In the scalene syndrome the scalenus anterior may compress the subclavian artery against the first rib and give rise to similar changes Both are more likely to occur where loss of muscular tone permits sagging of the shoulders

Auscultation

This is *generally not of great importance but it may help in certain* cases e g., in arterio venous fistulae of all sorts, whether congenital or acquired a continuous bruit may be heard sometimes described as a machinery murmur and in aneurysm also a bruit, mainly systolic is heard

SPECIAL EXAMINATION

The special investigations which may be carried out in elucidating peripheral vascular disease may be classified under (*a*) a group of tests specially applicable (*b*) radiography (*c*) infra red photography (*d*) ophthalmoscopy (*e*) capillary microscopy and (*f*) the Goetz finger plethysmograph

Numerous tests have been evolved which may give a great deal of information on the peripheral vascular supply of the tissues especially the limbs

Elevation of the Limb The average individual with normal vessels shows little change on moderate elevation of the limb He may be per spiring with vascular dilatation and yet no change be seen on raising the foot.

In cases of vascular disease which is mainly arterial elevation causes marked pallor Both feet should be raised about eighteen inches for comparison The more affected limb always becomes paler than the other as both are practically never evenly diseased It is naturally important to know which is the worse from a prognostic point of view

Goldflam s Sign This consists in the evacuation of the blood from the distal part of the limb by exercise. It may be carried out by getting

the patient up on tip-toe several times or the patient can lie flat on a couch and work the ankle up and down alternately a few times If the arterial supply is restricted the toes and a variable part of the foot become pale, and the worse the ischaemia the longer the pallor continues The above tests are easily performed give useful information and are within the scope of the general practitioner

Walking Test The patient walks a certain distance to demonstrate that he gets intermittent claudication and the distance covered indicates the severity of the vascular interference The information thus obtained may be supplemented by the ergograph which records the time and number of muscular efforts possible before pain stops them It is a more exact scientific measurement of the patient s disability

These tests are limited to an assessment of the muscle circulation and give no information as to the circulation in the digits which is the chief factor in threatened gangrene and which may be seriously damaged without intermittent claudication ever having occurred

Venous Filling Time The veins are emptied and the time taken for them to refill is noted In a normal individual this takes about seven seconds but it may take two minutes or more where gross arterial interference is present. The more prolonged the time taken the more advanced the condition, and the more the likelihood of organic vascular disease

Skin Temperature This is chiefly of value by comparison of the two limbs It is easily performed as a rough estimate in a consulting room by taking the resting skin temperature of the feet and then warming up the patient by immersing an arm in hot water for 30 minutes when the temperatures are retaken. In cases of vasco spasm the skin temperatures are likely to rise to the normal level of 34° C when exposed fully dilated whereas in organic disease they may be curtailed according to the degree of the affection.

Where there is inequality on the two sides the more diseased side will show the lesser rise of temperature The temperature of chief importance is that when the vessels are fully dilated as it is then that ischaemia is definitely shown. It is important to keep in mind that the skin temperature on dilatation may rise to the normal level and still, by other tests it may be shown that there is definite organic vascular disease present It is well to remember too that the skin temperatures taken with an ordinary thermometer are more or less valueless scientifically the best results are obtained by the use of a thermo couple

Oscillograph This measures the pulsation in the limbs and therefore applies to the larger vessels It is useful in indicating a block in the bigger arteries e g, between the calf and the middle of the thigh, i e it demonstrates interference with the penultimate circulation It gives however no real idea of the liability to the development of gangrene as the pulses may be absent and yet the peripheral circulation be quite

adequate for all purposes Both limbs should be tested for comparison

It must always be remembered that the important thing is the circulation during full dilatation, which represents the best that can be obtained The state of the circulation at rest, therefore does not give the information required for prognosis A useful clinical point arises as the result of a dilatation test, however the dilatation has been effected, whether by warming up , lumbar diathermy, protein shock spinal anaesthesia or nerve block If the patient reports symptomatic relief from the carrying out of the test, it indicates that there is a big spastic element and that the outlook is good following medical treatment in some cases or sympathectomy By it a functional *versus* organic interference with the circulation can be assessed fairly well

Radiography A considerable amount of information may be obtained by the use of X rays Calcification of vessels can usually be seen and its extent demonstrated It is, therefore useful in atheromatous and arteriosclerotic conditions but will not help in cases of pure diabetes and Buerger's disease

Osteoporosis may also be readily shown Apart from that due to disuse atrophy which is inclined to be more diffuse it may occur in peripheral vascular disease, especially with dilatation and hyperaemia and it is then localised to the affected area It occurs in Sudeck's dystrophy following local injuries when the bone appears thinned and mottled

Calcinosis can usually be readily demonstrated occurring in the distribution of the areas of poorer circulation It is chiefly seen in the more severe cases of Raynaud s phenomenon

A cervical rib can usually be demonstrated radiologically, if it is there, and there has been any doubt of it on palpation

Angiography should probably be used much more than it is at present Its chief deterrent is the fear of damaging the vessel lining and so increasing the vascular deficiency The safer and less irritant the injected substance is found to be the more the test will be carried out Both arteries and veins may be shown up together with blocks and dilatations, and also the development of the collateral circulation Other methods of investigation however, especially the plethysmograph will give the same information usually with more detail and no risk (Figs 318 324)

Infra red Photography This penetrates the tissues and so shows up the blood vessels both arteries and veins It may also demonstrate arterio venous fistulae

Ophthalmoscopy will reveal the condition of the circulation in the fundus and give a certain amount of information about the general circulation

Capillary microscopy is interesting but is still more or less undeveloped and its importance at the moment tends to be over rated Much of the



319a



319b



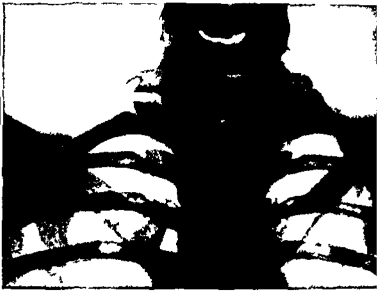
Fig 319 a and b (a) Sudeck s dystrophy of bone following injury of soft parts (b) Opposite normal foot

Fig 320 X ray photograph Gross calcinosis in tissues A case of progressive systemic sclerosis (generalised scleroderma)

320



321a



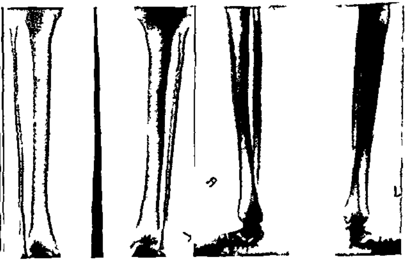
321b

Fig 321 Photograph and X ray (*a*) Cervical rib producing a visible swelling in the supraclavicular triangle (*b*) Well marked cervical rib shown Patient with marked Raynaud s syndrome relieved by removal of rib

Fig 322 *a* and *b* Photograph and X rays Hypertrophy of the limb the result of an arterio venous fistula



322a



322b



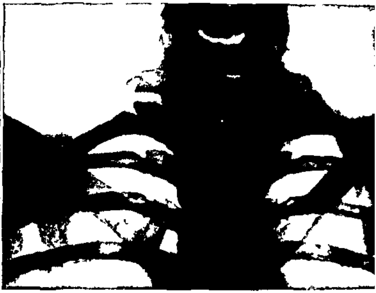
Fig 323 X ray photograph Arteriogram showing organic narrowing of the popliteal artery



Fig 324 X ray photograph Venogram in a case of Pan coast tumour with blocked axillary vessels



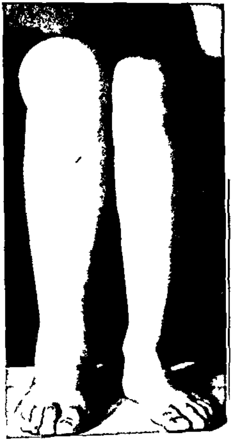
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322a



322b



Fig 323 X ray photograph Arteriogram showing organic narrowing of the popliteal artery



Fig 324 X ray photograph Venogram in a case of Pan coast tumour with blocked axillary vessels

irregularity of the capillary bed is insufficiently understood to draw too rigid conclusions

Goetz finger plethysmograph This gives a great deal of exact information, but is very highly specialised as a test (Figs 325)

Pulse In many of the cases of peripheral vascular disease there is quite a good pulse obtainable at the wrist or ankle and the casual observer might say that there was nothing wrong, but in actual fact there may be no pulse in the fingers or toes Thus the finer or ultimate part of the vascular tree may be involved alone This can be readily determined by the plethysmograph

The *pulse volume* is of the greatest importance and it can be judged from the height, as shown in the tracing The various types of pulse are readily demonstrated

The *skin temperature* may rise to normal but in spite of that the circulation may still be grossly interfered with Consequently the skin temperature without collateral evidence from the plethysmograph may be quite misleading.

The *amount of circulating blood* required to keep the skin and subcutaneous tissues alive is just over one per cent of the volume circulating in full dilatation in a normal individual. In these circumstances, when a patient comes with threatened gangrene, the circulation is reduced almost to nil

Dilatability is a most important feature to establish It is indicated by the height of the pulse tracing and particularly by its relative increase over the resting condition. It is indicative of spasm but even in the presence of this the comparison with a normal tracing is essential to determine whether, in addition, there may also be organic vascular disease In the absence of dilatability, the presence of pure organic occlusion is evident and its extent will be measured by the height of the tracing obtained If there is no pulse at all then the condition must be regarded as extreme Dilatation by warming has replaced most other methods in ordinary examinations as the same information is obtained by it.

Tissue volume in relation to pulse changes In some cases although the pulse or the absence of it does not alter with a general vascular dilatation the digital volume increases This is a most valuable observation since it means that the digital vessels are incapable of dilatation and hence the increased digital volume is due to the collateral circulation The importance of this cannot be exaggerated, as we must interpret it as indicating that the collateral circulation is able to give the same relief that dilatation of the ordinary vessels of supply would offer The two conditions are quite distinct and there is no other way of demonstrating them apart from the plethysmograph

Both the increase in the size of the pulse and of the tissue volume

indicate the presence of a functional element, which may be affecting the main or collateral circulation If neither is increased on general dilatation, nothing can be done to increase the circulation actively

The only method then by which the circulation can be increased is by mechanical means, e g , passive venous congestion or intermittent venous occlusion In both venous stasis must be avoided at all costs, and by that is meant the retention of the venous blood in the tissue after it has ceased to be of any value nutritionally

In the case of intermittent venous occlusion, twenty seconds is the usual period employed for the venous block, and this is too short a time for the blood to become entirely effete Should dilatation be evidenced either by pulse or tissue volume increase, we are justified in employing methods which increase the circulation by vascular dilatation

Venous Congestion Test Here, also as soon as the venous return is interfered with, the tissue volume increases but this represents passive venous hyperaemia and is entirely different from arterial dilatation

In order to avoid venous stasis a vascular balance must be obtained, i e the arterial pressure must be sufficient to keep the circulation moving at the new high volume level If the arterial disease and occlusion are sufficiently marked, at no stage may we be able to get a balance the volume steadily increasing until arterial arrest occurs

In the average case with a pressure cuff of 60 mm Hg a perfect balance is readily established If there is a gross disease we might be fortunate to get a balance at 20 30 mm of mercury

Before the use of the plethysmograph passive venous hyperaemia was carried out in an entirely empirical manner and there was a great deal of hit and miss about it For that reason it was often a failure when it might have been a success The Pavaex apparatus while good in certain cases must be adjusted to the vascular balance It is definitely contra indicated in those cases with ulceration and infection, as the negative pressure period tends to cause the infection to spread up the limb

Associated Record of Skin Temperature and Plethysmographic Changes As has been mentioned, the skin temperature during general vascula dilatation may reach the normal level of 34° C and yet the patient have definite organic disease of his arteries and this combination can only be determined by the plethysmograph

With limb elevation and emptying of the veins the skin temperature will drop whereas with a venous congestion and a vascular balance the skin temperature rises It does not rise immediately as, e g , during the venous congestion test lasting only a few seconds, but will do so if the condition persists In venous stasis on the other hand, the temperature drops

The interpretation of this is that it is the amount of circulating blood

irregularity of the capillary bed is insufficiently understood to draw too rigid conclusions

Goetz finger plethysmograph This gives a great deal of exact information but is very highly specialised as a test (Figs 325)

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The *pulse volume* is of the greatest importance and it can be judged from the height as shown in the tracing The various types of pulse are readily demonstrated

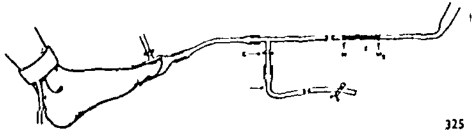
The *skin temperature* may rise to normal but in spite of that the circulation may still be grossly interfered with Consequently the skin temperature without collateral evidence from the plethysmograph may be quite misleading

The *amount of circulating blood* required to keep the skin and subcutaneous tissues alive is just over one per cent of the volume circulating in full dilatation in a normal individual In these circumstances when a patient comes with threatened gangrene the circulation is reduced almost to nil

Dilatability is a most important feature to establish It is indicated by the height of the pulse tracing and particularly by its relative increase over the resting condition It is indicative of spasm but even in the presence of this the comparison with a normal tracing is essential to determine whether, in addition there may also be organic vascular disease In the absence of dilatability, the presence of pure organic occlusion is evident and its extent will be measured by the height of the tracing obtained If there is no pulse at all then the condition must be regarded as extreme Dilatation by warming has replaced most other methods in ordinary examinations as the same information is obtained by it

Tissue volume in relation to pulse changes In some cases although the pulse or the absence of it does not alter with a general vascular dilatation the digital volume increases This is a most valuable observation since it means that the digital vessels are incapable of dilatation and hence the increased digital volume is due to the collateral circulation The importance of this cannot be exaggerated as we must interpret it as indicating that the collateral circulation is able to give the same relief that dilatation of the ordinary vessels of supply would offer The two conditions are quite distinct and there is no other way of demonstrating them apart from the plethysmograph

Both the increase in the size of the pulse and of the tissue volume



325

Fig 325 Goetz digital pl thys mograph

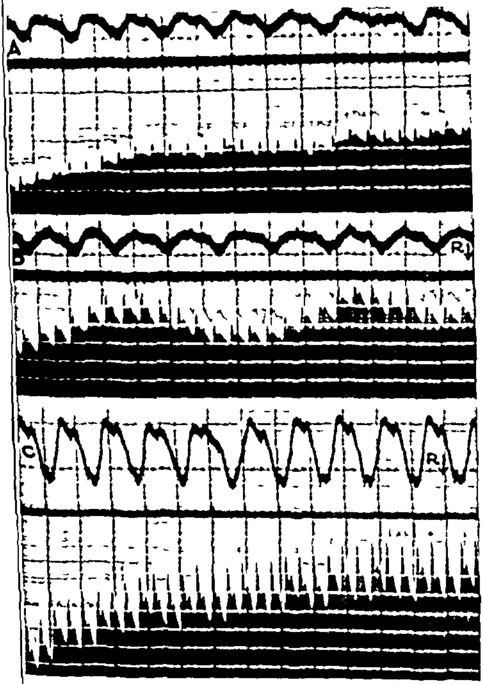
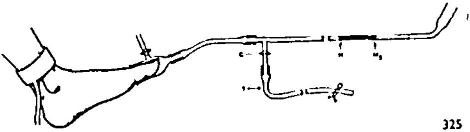


Fig 326 Plethysmogram showing pulse volume of a normal subject (a) During rest (b) During body heating (c) With full dilatation

326

in the tissue which determines the temperature and not the volume of blood present *per se* as in the case of venous stasis The vascular balance controls this as all the blood is circulating while in venous stasis a large part of the blood is static and not circulating (Figs 326-329)



325

Fig 325 Goetz digital plethysmograph

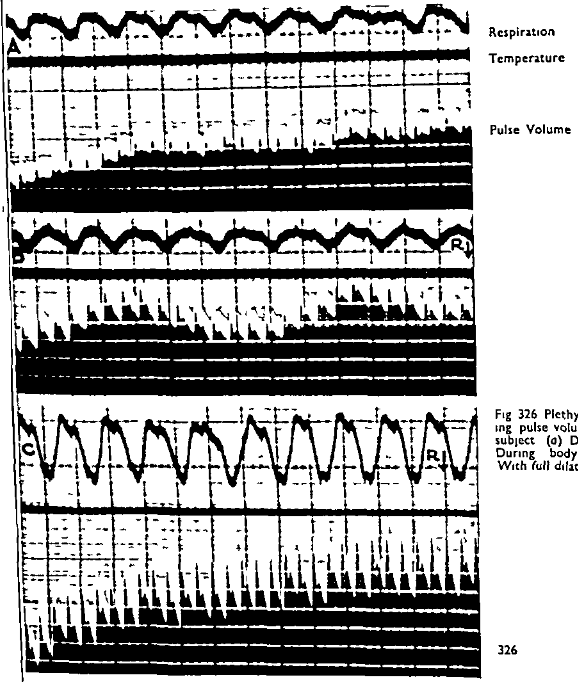
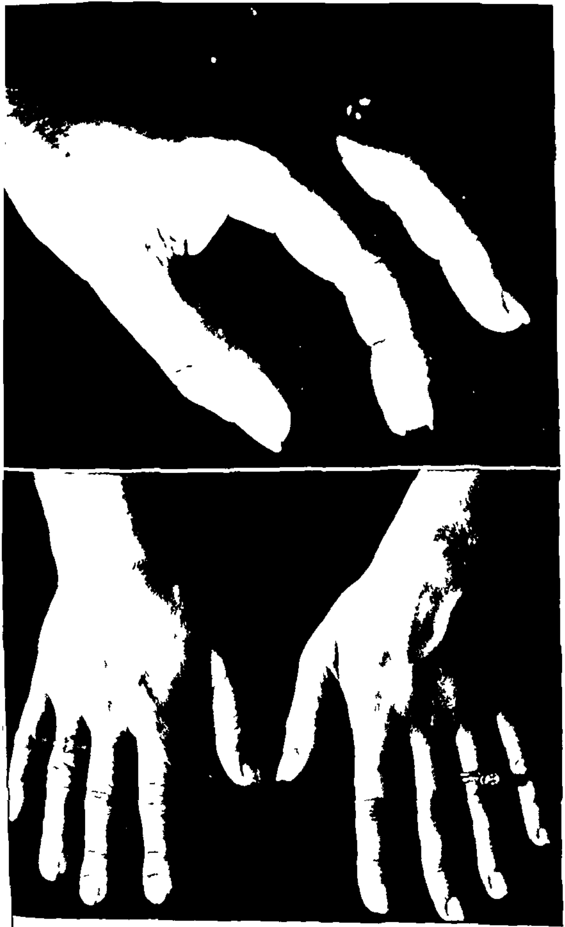


Fig 326 Plethysmogram showing pulse volume of a normal subject (*a*) During rest (*b*) During body heating (*c*) With *full* dilatation

326

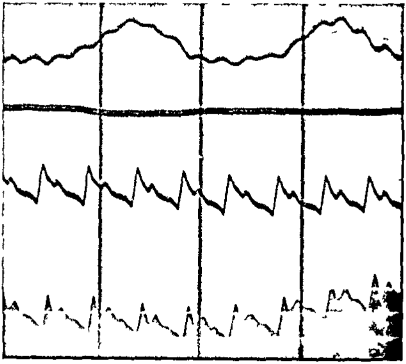
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329a

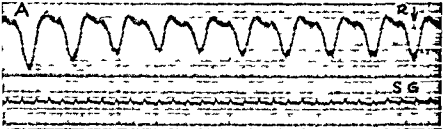
329b

Fig 329 a and b (a) Glomus tumour of the pulp of the left index finger (b) Shows increased surface veins associated with the tumour



327

Fig 327 Oscillogram (radial artery) and plethysmogram (second finger) taken simultaneously in the same normal subject Tracings the same Respiration and skin temperature are also recorded



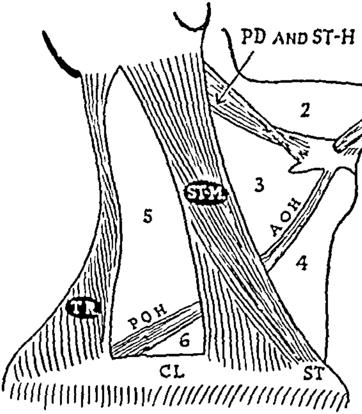
328

Fig 328 Plethysmogram and oscillogram simultaneously recorded in two cases both showing marked diminution of the peripheral blood flow as judged by the extremely small pulse volume in the plethysmogram The oscillogram (S G) however shows normal values in B while being diminished in A This indicates that the interference with the blood flow involves the main vascular tree in A but only the smallest vessels in B

By courtesy of the American Heart Journal (Goetz R. H 31 146 1946)

ıg 330 Drawing of the rıangles of the neck

Submental triangle (included in mid line)
Submaxillary triangle
Carotid triangle
Muscular triangle
Occipital triangle
Supraclavicular triangle
D Anterior belly of digastric.
D and St.H Posterior belly of digastric and stylohyoid
t.M Sternomastoid
r Trapezius
O H and A.O H Posterior and anterior bellies of omo hyoid
l Clavicle
t. Sternum



330



331

Fig 331 Thyroglossal cyst

very prone to exhibit fluctuations in size, especially the chronic ones

Progress and Development These will necessarily vary with the pathology An uncomplicated traumatic swelling after rapidly reaching its maximal size, steadily retrogresses and commonly disappears

Acute inflammatory swellings also develop rapidly and their subsequent progress depends on the termination of inflammation exhibited With *resolution* they steadily diminish and disappear With primary *fibrosis* they diminish more slowly and often do not disappear entirely, but leave a residual mass of fibrous tissue, which unfortunately may harbour pockets of organisms and so predispose to a subsequent recrudescence of the condition With *partial* and *total destruction*, abscess formation or even extensive sloughing may occur the ultimate result always entailing scar formation and disfigurement with secondary fibrosis and possibly also persistent sinuses

Neoplasms tend to be locally progressive and, while fluctuations may occur from haemorrhage into them they do not tend to disappear, though much fibrosis may take place in some of them

Some of the vestigial congenital cyst formations may alternatively fill up and evacuate their contents, secondary infection either preceding or following such an event

Extension in both the infective and neoplastic conditions may occur in any of the usual ways, and the patient may be quite familiar with such development

In infective cases lymphatic and blood spread may lead to further swellings or the blood conditions of toxaemia septicaemia, pyaemia and septico pyaemia involving generalisation of the infection, while in the neoplastic cases dissemination is limited to the malignant ones and varies with the sarcomas and carcinomas as described previously Local extention involving adjacent structures and the skin, occurs as already noted with a variation of detail according to the pathology present

Any Interference with Swallowing Breathing, Speech or Sight? All such interference is readily observed by the patient as the digestive and respiratory tracts as well as the eyes are in constant use usually passing unnoticed unless anything is wrong with them Pressure, with or without displacement readily occurs especially at the bony inlet to the thorax while infiltration may take place in any situation with obstruction or involvement of nerves e g the recurrent laryngeal or cervical sympathetic Any swelling may produce mechanical disturbance and the inflammatory and malignant ones may infiltrate

Any Associated General Disturbance e g Fever Loss of Weight Nervousness Irritability etc? This will necessarily vary with the pathology, whether acute or chronic inflammatory whether neoplastic simple or malignant and whether such structures as the thyroid gland are affected

Before proceeding to a more detailed description, it would appear well to consider conditions as they affect the lymph glands, since these glands are not only present in every part of the neck but they are responsible for the largest proportion of the neck swellings as they are encountered clinically The common swellings of the lymph glands are secondary to some primary focus of infection or malignant disease and the situation in which they occur is *therefore, determined by that* of the primary source of mischief It is chiefly a question of simple *anatomy with the reservation, however, that if the main avenue of* drainage is blocked circuitous routes of lymph spread may be utilized, including the so-called retrograde spread

The acute inflammatory swellings present the typical features of that condition The swelling comes up quickly and is introduced and accom panied by pain often of a very severe degree, the primary focus being usually indicated by its own quota of pain some time previously The whole story of acute inflammation is epitomised in such a case There is the associated fever and toxaemia, the local manifestations depending on the stage of the pathology

Until retrogression sets in pain continues in severity parallel with *the acuteness of the inflammation becoming throbbing if pus forms* The swelling is hot acutely tender according to the acuteness of the inflammation and firm with grading depending on the tension of the exudate and whether it is coagulated or not The surface on the whole is smooth the edge is ill defined and shelving into the surrounding structures as a result of the diffusion of the inflammatory exudate, and its relations to surrounding parts being similarly controlled so that it rapidly becomes adherent to them Adjacent glands instead of remaining discrete quickly become matted together Should suppura *tion occur the centre of the swelling shows fluctuation and as the pus comes to the surface the skin becomes adherent to the swelling then* inflamed and oedematous and finally discharge occurs at its apex Should the inflammation not have terminated in suppuration, or after the discharge of the pus if that has formed pain steadily diminishes as the inflammation clears up and the swelling corresponds

While a *chronic* or *low grade pyogenic infection* may be responsible for a chronic inflammatory swelling of the lymph glands *tuberculosis* is its usual cause The great majority of the infections take place in childhood through the bucco pharyngeal mucosa and as a result the enlarged glands occupy the upper part of the neck at first, especially the tonsillar gland in the region of the carotid bifurcation From there extension may take place to any or all of the glands in the neck In older patients however it is quite common to see the glandular invasion commence in the supra clavicular fossa or even medial to the inner border of the sterno mastoid insertion and then spread upwards from there In these

As a rule, for a patient to appreciate the presence of fever he has to have a considerable rise of temperature and this is more likely to accom pany the acute infections However, the more active chronic infections, especially if they be mixed, and the more rapidly growing malignant tumours may also present fever

Loss of weight is likely to accompany any toxic state, whatever the cause

PREVIOUS HISTORY

Any general condition, e g , fever, ill health, anaemia, acute indigestion, etc? Such condition may indicate a primary focus of disease in the chest or abdomen, or even a blood condition.

Any local condition, e g , mouth, nose, throat, etc , or previous similar swellings? Here also a primary focus may be indicated which is par ticularly common in neck swellings, so many of them being secondary

FAMILY HISTORY

Tuberculosis is no doubt the commonest disease to affect multiple members of a family and similar swellings may indicate the same origin, though in a small number of cases similar neoplastic swellings may be met in several members of a family, not necessarily limited to one generation or sex

PHYSICAL EXAMINATION GENERAL

Facial Appearance This will commonly show whether the patient looks ill or not, whether flushed from fever, generally so in acute cases, with malar flush and the rest pallid in chronic cases, whether anaemic, cyanosed in respiratory obstruction or cardiac disturbance, excited, calm or apathetic, or wasted and cachectic The temperature and the pulse should be recorded, as they are often of value in suggesting the nature of the pathology Chest, abdomen and blood examinations fall in this category but often they are not necessary and may be more con veniently referred to under 'Special Examinations ' where indicated

PHYSICAL EXAMINATION LOCAL

For purposes of description it is customary to subdivide the neck into different areas or zones i e the mid line and the anterior and the posterior triangles (Fig. 330)

The mid line extends from the chin to the upper end of the sternum and includes the submental triangle

The anterior triangle is subdivided into the submaxillary carotid and muscular triangles with their boundaries

The posterior triangle is also subdivided into an upper occipital and a lower supra clavicular triangle with their boundaries

or the thyroid may also give rise to them On the other hand, a primary sarcoma of lymph tissue viz the lymphosarcoma rapidly leads to *involvement of adjacent glands but in such a case the primary growth* is the outstanding feature The sarcomatous glands usually infiltrate become matted and fix more slowly than the carcinomatous ones, with the exception of those due to lymphosarcoma These are rarely hard like the carcinomatous glands, but tend to be more or less elastic instead *of being stony and non resilient*

The primary affections of the lymph glands are mostly serious in nature, whether or not they are associated with blood diseases Those forming part of the picture of the leukaemias are unlikely to come for a surgical opinion and as a rule affect the glands diffusely, without their reaching a large size They are more commonly seen in lymphatic leukaemia

A group of conditions, comprehensively described as malignant lymphomata' and still imperfectly understood, covers a wide and varying field which will probably be even more split up in due course into different entities Meanwhile clinically, conditions are included of milder nature alongside those of great malignancy and naturally their physical manifestations vary accordingly Both the clinical and patho logical features shade into one another

For the present purpose three clinical types only will be described, under the headings lymphosarcoma Hodgkin's disease and follicular lymphoma Under lymphosarcoma may be included the reticulum cell sarcoma the Hodgkin sarcoma and the lymphocytic lymphoma, as they may be indistinguishable on purely clinical grounds The term Hodgkin's disease here refers especially to the type known as the Hodgkin lymphoma to the exclusion of the Hodgkin sarcoma , which is considered under lymphosarcoma The follicular lymphoma, as the name implies is that in which new tissue formation results in follicle-like nodules of varied size

Lymphosarcoma is a rapidly developing malignant condition which is unlike the average sarcoma in that it infiltrates quickly and widely and in addition to dissemination by the blood stream, spreads freely by lymphatics whereby adjacent lymph glands are soon affected and become matted and incorporated in the primary growth As a result of this wide infiltration, the primary focus rapidly becomes a large mass and the skin contrary to what is usually seen in sarcoma, is destroyed by infiltration like a carcinoma and not by pressure from underneath The result is that as ulceration takes place the ulcers form part of the growth just as in the case of carcinoma It is the only sarcoma to do this regularly The mass is usually hard and inelastic though not of the stony hardness of carcinoma

What may be described as the typical case of Hodgkin's disease

cases the usual explanation is a primary focus in the lung apex with pleural adhesion and spread and then drainage infection of the glands in the posterior triangle Clinically it is an important extension since as it means involvement of the apical parietal pleura, these cases are unlikely to permit of apical collapse from artificial pneumothorax, be cause of adhesions

In the case of the medial gland the extension has come up from the mediastinum As is well recognized a large percentage of these tuberculous glands retrogress and may be cured or rendered quiescent but should the process be progressively destructive, the glands break down and discharge on the surface or have to be evacuated Extension in such cases occurs by continuity of tissue towards the skin and in the younger cases where the early glands are mostly under cover of the sterno mastoid the pus tends to reach the surface either in front or behind the muscle the focus becoming densely adherent to the muscle sheath in the process At times the extension carries the infection into and through the muscle and in such cases a narrow track connects the deep focus with the subcutaneous abscess As a very rare event the tuberculous infection may extend diffusely in the muscle belly and produce a condition the exact counterpart of a psoas abscess in cases of tuberculous spine Following discharge secondary pyogenic infection is likely to lead to persistent sinuses and keloid scar formation As the tuberculous abscess pierces the deep fascia and the muscle belly and extends into the subcutaneous tissue a dumb bell or collar stud condition may be produced with an expansile impulse in the surface cavity on tightening the neck muscles by any manoeuvre

Syphilis except in the primary and secondary stages is unlikely to affect the cervical glands The swelling is rarely of any size and the glands are multiple and remain discrete and shotty

Actinomycosis which is relatively common in South Africa usually extends by continuity of tissue and does not as a rule involve the lymph glands of drainage

Of the secondary malignant glands those of *carcinomatous origin* are the common ones Any part of the bucco naso pharyngeal passages or the associated sinuses the larynx and upper part of the oesophagus may be the primary focus while the skin is not infrequently responsible especially in South Africa and the melanomas must be included as well as the epitheliomas

The glands are typical of the condition being usually very hard and tending to early infiltration fixation and matting What is known as an epitheliomatous cyst sometimes develops representing a broken down degenerate gland often with secondary pyogenic infection

Perhaps the commonest sarcoma to serve as a primary focus for secondary neck glands is that of the tonsil though that of the fascia

therefore, is not only involved but is part of it, deeper swellings approaching the surface may present the usual variety of manifestations, e g , redness dilated vessels oedema, either vascular or lymphatic, adhesion and puckering of the skin or ulceration The detail of these features has been previously considered, e g , in Schemes III, IV and XIII and so calls for no further description

Pulsation This may be either extrinsic and transmitted or instrinsic and expansile In the former case it means juxtaposition of the swelling to a big artery, in the latter either a swelling of vascular origin, e g., an aneurysm or a swelling with a high degree of vascularity

Mobility with Deglutition or Protuding the Tongue This is characteristic of all swellings attached to the tongue and the larynx, whether developmentally or pathologically It is an important differential feature

Are Movements of the Neck interfered with? Such interference may result from any inflammatory condition causing pain on movement but it may indicate involvement of the muscles or spine controlling the movements of the neck

Translucency This is an important point to decide in cystic swellings, as indicative of their possible nature The only cysts likely to be translucent are those with an endothelial or mucous lining and containing serous or mucoid fluid, e g , the hygromas and the thyroglossal or similar cysts with cubical or columnar (sometimes ciliated) epithelium The cysts lined with squamous epithelium are not translucent, whether they be simple, e g , sebaceous or dermoid, including implantation, sequestration and branchial, or malignant, as in the case of the so-called epitheliomatous cyst

Cysts due to degeneration of neoplasms are not as a rule translucent, though the myxosarcoma may be Pus and blood containing cysts are not translucent Lipomas which may give a deceptive semi fluctuant feel, may be translucent if small and projecting With fibrous tissue development they become more opaque

PALPATION

Heat and tenderness as usual are the first points to be decided on palpation and they usually go together in parallel degrees They commonly indicate inflammation its acuteness varying with them but tension from any other cause, e g haemorrhage or rapid infiltration, or nerve involvement may also be responsible As one has often emphasized their assessment must be carried out with the utmost gentleness as if the confidence of the patient is destroyed by rough handling, no further examination may be permitted

Single or Multiple Palpation confirms what may have been seen although quite commonly many swellings will be felt which are not visible There are few multiple swellings except lymph glands, but a

consists in a wide involvement of lymphatic glands throughout the body though in some cases a limited group may be involved alone for some time The spleen is grossly involved and less often the liver, and other tissues less often still The glands do not as a rule attain a great size individually, though the groups may form a considerable swelling, and they tend to remain discrete and rarely break down They are usually firm and elastic but not hard Unfortunately, so far as the glands are concerned a type of diffuse tuberculous gland infection is met from time to time in which, clinically, differentiation may be impossible without biopsy In such tuberculous cases the spleen may also be enlarged

The follicular lymphoma like the lymphosarcoma is at first a limited more or less localised condition, with little or no tendency to infiltra tion, giving rise sometimes to large swellings which however, remain well defined and apparently encapsulated Its main local spread is by lymphatic extension The swellings are usually softish and elastic While all three conditions are very susceptible to deep X ray therapy, the follicular lymphoma appears to be at times entirely cured the Hodgkin s kept in abeyance for some time and the lymphosarcoma has commonly extended too far to be eradicated, though locally it may disappear It is the most resistant

Apart from the distribution of the neck swellings their characters as a whole require some description

Inspection

The Size and Shape of the Swelling Most swellings do not attain a very large size before they first come to a medical man The largest swellings are commonly neoplastic and may be either simple neglected for years because they have caused no trouble except their appearance, or malig nant when they are probably in an advanced stage and beyond the scope of surgery

The shape of the swelling is often controlled by its surroundings, increase in size taking place along the paths of least resistance Conse quently certain swellings are characteristic e g the butterfly enlarge ment of the thyroid the elongated shape of a sterno mastoid swelling or the elliptical form of a branchial cyst As the swelling increases it is liable to lose its earlier contour

Is the Swelling Single or Multiple? Lymph glands the commonest of all swellings are usually multiple though in acute infective conditions they may become matted together into a single mass Congenital abnormalities and neoplasms are for the most part single though both may be multiple in the case of malignant disease secondary glands being the usual cause

Character of Overlying Skin—whether Involved or Not? Apart from the fact that the swelling may have begun in the skin and that the skin

therefore, is not only involved but is part of it, deeper swellings approaching the surface may present the usual variety of manifestations, e g , redness, dilated vessels oedema either vascular or lymphatic, adhesion and puckering of the skin or ulceration The detail of these features has been previously considered, e g , in Schemes III, IV and XIII, and so calls for no further description

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primary focus may be present as well In the more extensive though rare neurofibromatous masses, multiple swellings may be present

Superficial or Deep This chiefly confirms the plane involved by the swelling but much more detail may be obtained by palpation than inspection especially the degree of extension towards the surface

Pulsation Here again confirmation of what was seen will be obtained and a more exact opinion formed as a rule

Consistency All parts of the swelling must be palpated as variation in the consistency in different areas is quite common in most swellings whether of traumatic, inflammatory or neoplastic origin e g clotting of blood and separation of serum, suppuration in the central zone of any inflammatory focus degeneration or calcification in tumours *Compressibility* is also an important feature It is most commonly seen in swellings of vascular origin, whether neoplastic or not A false sense of compressibility may be obtained in a cystic hygroma with loculi extending deeply and widely

The ordinary oesophageal sacculus, usually found in the lower part of the left side of the neck, can be emptied by pressure usually with a gurgle as air and liquid are squeezed out together

Surface The surface of a swelling must also be palpated as a whole and in detail It may be wholly smooth or irregular The irregularities may be large, giving rise to bosses which themselves may be smooth e g multiple lymph glands or the multiple adenomata of the thyroid The same applies to the lobulation of any simple tumour On the other hand the irregularities may be small and diffused over the surface as in the infiltration round a carcinoma

Inflammatory foci are usually smooth in the early stages with the diffusion of exudate but irregularities may develop with areas of suppuration or extension Most of the congenital cysts are unilocular and simple and therefore smooth while the hygroma is frequently multilocular and generally irregular with the individual projections smooth

Edge The edge may be well or ill defined While a well defined edge suggests chronic rather than acute inflammation and simple as opposed to malignant tumours and an ill defined edge the reverse in both cases one must recognize that this is by no means 100 per cent correct The nature of the edge depends on the perfection of a capsule and the degree of infiltration separately or combined and this applies to both inflammatory and neoplastic conditions The acute inflammatory conditions present a much more wide spread inflammatory infiltration with exudate than the chronic ones which mostly give a well defined mass of cellular proliferation rather than exudate and it must be remembered that most simple tumours occur at times without capsules while malignant tumours, especially the sarcomas may give the impression of a good capsule where infiltration is minimal As the exudate is absorbed at the peri-

phery of an acute inflammatory focus, the edge becomes better defined whereas in a chronic inflammatory focus with extension by continuity of tissue into surrounding structures the edge becomes more ill defined

Relation to Surrounding Parts This as elsewhere, is of the greatest possible importance as furnishing a great deal of information, essential to a detailed diagnosis and prognosis Only certain features need special reference

The stretching or infiltration of the skin over a swelling has the usual significance, but attention has been drawn, and it should be emphasized, that in the neck in particular, the lymphosarcoma is likely to present an outstanding exception to the usual sarcoma stretching rather than infiltrating it

In the case of the muscles, intrinsic swellings are not common in the neck, and hence particular care must be exercised in determining whether a swelling is intrinsic or extrinsic and, if the latter whether it is simply adherent to the muscle or infiltrating it In the inflammatory swellings adhesions rather than infiltration are the commoner, though both are met, while in the malignant tumours infiltration is the common event with carcinomas whereas the sarcomas infiltrate very sparingly and rather tend to become adherent and displace the muscle

The displacement or incorporation of vessels, chiefly the carotids, is also important, as the simple tumours displace them while the carcinomas incorporate them An exception is the carotid body tumour which whether simple or malignant tends to grow round and imbed the vessels

Nerves like the vessels may be pressed upon and displaced or infiltrated and the same remarks apply to them as to the vessels

Structures like the larynx the trachea and the oesophagus may similarly and in like circumstances be pressed upon and displaced or infiltrated

The question of mobility or fixation of a swelling is a further important clinical feature as indicating the extent of the pathology and also the different structures involved e g fixation to a muscle permits movement across its fibres even when the muscle is contracted whereas fixation to an immobile structure fixes the swelling in all circumstances

PERCUSSION

This is unlikely to be of importance in most neck swellings but is of value where the question arises about the continuation of a swelling into the thorax This applies whether the neck or the chest is primarily or secondarily involved

AUSCULTATION

This is also of relatively infrequent utility, but may be an important

primary focus may be present as well In the more extensive though rare neurofibromatous masses, multiple swellings may be present

Superficial or Deep This chiefly confirms the plane involved by the swelling, but much more detail may be obtained by palpation than inspection, especially the degree of extension towards the surface

Pulsation Here again confirmation of what was seen will be obtained, and a more exact opinion formed as a rule

Consistency All parts of the swelling must be palpated as variation in the consistency in different areas is quite common in most swellings, whether of traumatic inflammatory or neoplastic origin, e g clotting of blood and separation of serum suppuration in the central zone of any inflammatory focus degeneration or calcification in tumours *Compressibility* is also an important feature It is most commonly seen in swellings of vascular origin, whether neoplastic or not A false sense of compressibility may be obtained in a cystic hygroma with loculi extending deeply and widely

The ordinary oesophageal sacculus, usually found in the lower part of the left side of the neck, can be emptied by pressure usually with a gurgle as air and liquid are squeezed out together

Surface The surface of a swelling must also be palpated as a whole and in detail It may be wholly smooth or irregular The irregularities may be large giving rise to bosses which themselves may be smooth, e g , multiple lymph glands or the multiple adenomata of the thyroid The same applies to the lobulation of any simple tumour On the other hand the irregularities may be small and diffused over the surface, as in the infiltration round a carcinoma

Inflammatory foci are usually smooth in the early stages with the diffusion of exudate, but irregularities may develop with areas of suppuration or extension Most of the congenital cysts are unilocular and simple and therefore smooth while the hygroma is frequently multilocular and generally irregular with the individual projections smooth

Edge The edge may be well or ill defined While a well defined edge suggests chronic rather than acute inflammation and simple as opposed to malignant tumours and an ill defined edge the reverse in both cases one must recognize that this is by no means 100 per cent correct The nature of the edge depends on the perfection of a capsule and the degree of infiltration separately or combined and this applies to both inflammatory and neoplastic conditions The acute inflammatory conditions present a much more wide spread inflammatory infiltration with exudate than the chronic ones which mostly give a well defined mass of cellular proliferation rather than exudate and it must be remembered that most simple tumours occur at times without capsules while malignant tumours especially the sarcomas may give the impression of a good capsule where infiltration is minimal As the exudate is absorbed at the peri-

contained in them Where massive formation of the swelling occurs the production of a pachydermatocele results

MID LINE SWELLINGS

Seeing that this description covers the submental triangle, the thyro hyoid and the crico thyroid membranes and the suprasternal fossa, it must be accepted that the swellings may not be strictly in the mid-line but in any event are close to it

Thyroglossal Tract The Duct A cyst may develop in any part of its course above or below the hyoid bone, or in front of the larynx Frequently below the hyoid the duct deviates somewhat to the left and it may join the isthmus also to the left of the mid line The non infected cyst is usually translucent and naturally fixed to the larynx The so-called hyoid bursa is probably in most cases a thyroglossal cyst

The *pyramidal lobe*, representing the lower part of the duct, with thyroid tissue developed An adenoma may develop in it and one may feel thyroid tissue present like a tongue either above or below the adenoma

The Isthmus Here an adenoma may develop and be more or less central

A sequestration dermoid lined by squamous epithelium may occur anywhere in the mid line of the neck It is non translucent and usually superficial

Cysts may also occur in the suprasternal notch sometimes with an intra thoracic prolongation These resemble closely a thyroglossal cyst but we believe them to arise from a thymus remnant They are lined by columnar epithelium which may be ciliated and contain clear fluid They are not attached to the isthmus

What is apparently a sequestration dermoid may occasionally present similar relationships i e be deep to the deep cervical fascia and have a substernal prolongation. Such a cyst on the other hand, may be of thymus origin with metaplasia of the lining epithelium to a squamous celled type

Lymph gland enlargement may be found in the submental triangle, over the crico thyroid membrane or in the suprasternal fossa Any of the pathology described above may be met and the swellings may not adhere strictly to the mid line In the suprasternal fossa, where they may be infected from the chest especially in tuberculosis the dumb bell or collar stud formation frequently develops when the abscess formed bursts through the deep cervical fascia into the subcutaneous tissue

A gumma is not infrequently met in the mid line of the neck and most of them occur below the level of the thyroid cartilage in the supra sternal region They are typical in every way and usually give a history of at least two or three months before reporting to a doctor

An infected haematoma has been met in an infant occupying the

part of the examination of aneurysms, vascular tumours vascular interference and intra thoracic involvement

Evidence of extension of the pathology present must be looked for whether by continuity of tissue (local infiltration), contiguity of tissue lymphatic or blood spread, as this has a most important bearing not only on the complete diagnosis, but also on the prognosis and treatment

SPECIAL EXAMINATION

Special examinations may be indicated during the routine examination These will include search for a possible primary focus of disease by endoscopy or radiography, especially of the head with its various passages and also of the upper limb chest and abdomen while even the testis and the penis should not be omitted altogether

Blood examination may be most important including serological tests for evidence of infection blood diseases etc The B M R is commonly carried out in thyroid cases A biopsy for bacteriological and pathological investigation is also frequently demanded

In a brief survey of the swellings which may be met in the different tissues and regions of the neck the first group of conditions which can be quickly dealt with as they provide nothing out of the way, are those arising from the skin itself The more common ones include haemangioma lymphangioma keloid papilloma, sebaceous cyst and adenoma implantation dermoid and the carcinomas basal celled, squamous celled and melanotic Most of these conform in every respect to similar formations elsewhere and require no separate description Keloids are very common in South Africa especially in the native population and may reach a large size often becoming pedunculated and presenting a typical fibromatous appearance of whorls Occasionally they are of the nature of fibrosarcomas *with all that that signifies In such cases they are usually* only locally malignant and do not tend to disseminate

The basal celled carcinoma occurs in both forms quite commonly, viz as a rodent ulcer and as a lumpy swelling which we describe as a sebaceous carcinoma starting as it does in the hair follicles or sebaceous glands or even in a sebaceous adenoma In neither is there any tendency to dissemination.

Both squamous celled and melanotic carcinoma are relatively common the epithelioma affecting all sections of the population from constant exposure to sun and weather while the melanotic growths are especially common amongst the coloured sections both mixed and native These latter are especially difficult to eradicate by any means whether surgical or radiotherapeutic or both

The small swellings of von Recklinghausen s disease may be seen as part of a generalised condition the apparent swellings giving the sensation of actual hollows on palpation from the mucinoid material

suprasternal region but is a rarity The appearances become those of an acute abscess

A typical neurofibroma has also been met close to the mid line in the lower part a typical firm, smooth, slightly tender tumour in the subcutaneous tissue unattached to the skin (Figs 331 335)

Anterior Triangle

Submaxillary Triangle Lymph gland enlargement is the commonest swelling, usually secondary to buccal infections Consequently they are not likely to be the first glands to be infected with tuberculosis but rather to follow others Other pathology however differs in no way from what has been described

Swellings of the submaxillary salivary gland are not common but they cannot be described as rare

The intermittent swelling of the gland on mastication or smoking and due to a small calculus in the duct is quite characteristic However where infection and inflammation are also present either as the cause or a complication persistent swelling of the gland may be present in addition, and in these cases pus can usually be expressed from the duct The stone can often be felt in the floor of the mouth along the course of the duct When the stone cannot be felt it can usually be seen on X ray

A mixed tumour of the gland is not rare though it is much less frequent than in the parotid gland It has the same characteristic features and in the absence of any signs of inflammation it is the most likely diagnosis In South Africa an hydatid cyst occasionally occurs in the gland but the diagnosis is nearly always missed

The enlargement of the gland in von Mickulicz s disease is a rarity It is usually bilateral, and involves the lachrymal and parotid glands as well. In Hodgkin's disease a swelling of the gland has been met but this is exceptional

The submaxillary triangle is a not uncommon site for a cystic hygroma, which may be quite extensive and involve the floor of the mouth as well as the adjacent muscles

These cases raise the question of ranula which, in an almost incredible way remains the subject of most unsatisfactory speculation

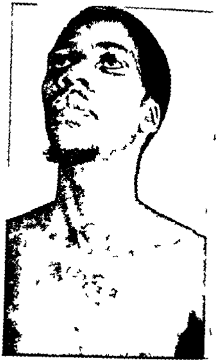
In the writer s experience ranulae are of two sorts—those lined by epithelium and those without it Those lined with epithelium may arise in any of the glandular structures in the floor of the mouth whether mucous or salivary glands and the epithelium becomes progressively flattened as the cyst increases in size None of them contains ordinary saliva and they are limited to the floor of the mouth and often to one side They are the less frequent type and in a considerable number excised represented only about one in six

Those with no epithelial lining are much more frequently met and



332

Fig 332 Sequestration dermoid



333

Fig 333 Tuberculous gland secondary to mediastinum

Fig 334 Gumma



334



335

Fig 335 Adenoma of pyramidal lobe of the thyroid



Fig 336. Salivary calculus with blocking of duct and swelling of gland





Figs. 337 and 338 Von Mickulicz syndrome (advanced)



Fig 339 Lipoma

they *include* all those *with neck extensions Indeed, they form the mouth* part of a hygroma, which involves the structures between the floor of the mouth and the neck, mainly muscles and show up as superficial swellings in the neck of varying extent and relations The commoner variety involves the submaxillary triangle and lies posterior to the mylo hyoid muscle, *while it is most uncommon for the mylo hyoid to be in* volved without the structures postero lateral to it The use of such terms as compound and plunging' ranula only serves to increase the fog surrounding the condition and is most misleading tending as it does to over emphasize the importance of the mouth swelling when usually the *neck swelling forms by far the greater part*

It is unquestionably the hygromatous nature of the extensive ranulas which accounts for the difficulty in complete excision, as they present the same lack of well defined capsule and the same muscle and other tissue involvement as any other hygroma

Complete excision of those lined by epithelium is necessary for a cure, and they usually enucleate easily whereas it is rare to be able to eradicate the hygromatous type and cure may have to be sought by X ray irradia tion to destroy the endothelial lining or by sepsis, which is likely to follow opening in the mouth and may lead to the formation of granula tion tissue and subsequent obliteration of the cavity Indeed, the old method of treatment by Seton depended on sepsis for any value it had (Figs 336 340)

Carotid Triangle Here lymph gland enlargement would appear to find its Eldorado as the vast majority of swellings in this region are due to their involvement Every type of affection is seen of which as usual secondary involvement inflammatory or malignant is by far the most frequent It is the pivot of the main drainage of the bucco naso pharyngeal tracts as well as the whole of the head following its primary drainage with the exception of the retro auricular portion which drains into the posterior triangle It is the first region to show tuberculous gland involvement especially in youth and extension takes place from there The glands are chiefly situated just under cover of the anterior border of the sterno mastoid and commonly extend forward from there though they may extend directly through the muscle or towards its posterior border

Clinically *typical lymphosarcomas commence* here *most frequently* as well as the classical cases of Hodgkin s disease It is well to bear in mind that at least three quarters of the cases diagnosed clinically as Hodgkin s disease are due to tuberculous infection of the glands The mistakes are due to failure of realization that tuberculous infection involving multiple glands remaining discrete is not at all uncommon, and the clinician is obsessed with the picture of localised glands breaking down and forming one or more sinuses

the operculum had not developed sufficiently to cover the gill slits completely

A carotid body tumour is a rarity and lies at first at all events under cover of the sterno mastoid It gives rise to the so-called potato tumour and envelopes the bifurcation of the carotid artery It may be simple or malignant Most of the other swellings in this region lie on one aspect only of the carotid artery and receive a transmitted impulse from it (Figs 341 345)

Muscular Triangle Perhaps the commonest swelling in this triangle is due to thyroid pathology affecting the lobes of the gland For the detail of their manifestations the reader must be referred to Scheme XIX where they are more or less fully described

Lymph gland enlargement is also common usually as an extension of involvement of glands situated higher up in the neck All forms of involvement may occur

The cystic hygroma is again not infrequently seen in this situation, with its usual characters while lipomata both subcutaneous and subfascial may be met and aneurysms of the lower part of the common carotid or innominate arteries are occasionally seen Traumatism and syphilis are again the usual causes It is in this triangle that the typical cervical sinus is met not representing the external opening of a single branchial cleft but rather the non-closure of the cavity resulting from the caudal bending over of the cephalic portion of the branchial region towards the trunk The opening if present is usually situated at the anterior border of the sterno mastoid low down an inch or two above its sternal insertion In some cases the aperture is closed and a cyst results, extending high up in the neck and possibly reaching the pharynx by passing between the origins of the external and internal carotid arteries These cervical sinuses are quite often bilateral

The common oesophageal sacculus arising at the junction of the pharynx with the gullet is usually seen if distended in this triangle, almost always projecting to the left It is found projecting from under cover of the anterior border of the sterno mastoid In addition to the deglutition difficulties it causes it can be emptied by pressure, with a gurgle It is more of a nuisance than serious though the more introspective patient may exaggerate his symptoms to such a degree as to more or less refrain from eating and so emaciate to a remarkable degree (Figs 346 347)

Posterior Triangle

Upper Occipital Triangle above the Posterior Belly of the Omo hyoid Muscle Here again lymph gland enlargement is quite common and the enlargements are mainly controlled by the anatomy of the part Thus tuberculous infection rarely occurs first here but nearly always

Parotid gland swellings involving the lower pole and encroaching on the carotid (or submaxillary) triangle are, perhaps the next most common swelling here These are most commonly the mixed tumour which though usually simple, may be malignant and cysts, which are usually simple retention cysts, but occasionally turn out to be hydatids in South Africa Primary carcinoma of the gland is much rarer but unlike the mixed tumour, it is likely to give rise to a much less defined swelling and to secondary glands in the carotid triangle at an early date The riding up of the lobule of the ear and the extension of the growth deep to the angle of the jaw are characteristic features of these swellings

Less common swellings in the carotid triangle are the cystic hygroma, remarkably common in South Africa and mostly among the coloured population and the branchial cyst usually an elliptical swelling opposite the body of the hyoid, projecting in a downward and forward direction from under cover of the anterior border of the sterno mastoid, perfectly smooth and fluctuating not translucent and unattached to surrounding structures unless secondarily infected It is lined by squamous epithelium A solid counterpart to this swelling is usually called a branchioma and is commonly malignant and a squamous epithelioma A carotid aneurysm is met from time to time either of spontaneous development usually in syphilitics or of traumatic origin It is characteristic in every way A congenital cervical sinus is uncommon in the upper part of the neck but when it occurs in the carotid triangle it is present at the anterior border of the sterno mastoid low down

The situation of both the cyst and the sinus appears to result from the development of the branchial operculum chiefly from the second arch similar to what is seen in fishes This normally fuses with the arches posteriorly and the space between them is obliterated If obliteration does not take place a cyst or sinus results according as the original skin opening is closed or not They are both lined by squamous epithelium

The ordinary branchial cyst that is met is situated much higher in the neck usually opposite the hyoid bone and is formed in relation to the original cleft, either the second or third as opposed to the opercular cavity which is a later formation and extends further in a caudal direction However the opercular cavity may be continued up into the cleft, when a resulting cyst is formed conjointly by them In such cases the deep extension of both passes upwards towards the pharynx between the external and internal carotid arteries belonging to the second and third arches respectively It also similarly passes between the facial and glosso pharyngeal nerves

It is simpler and clearer therefore to describe the lower cervical branchial cysts and sinuses as opercular in contradistinction to the branchial which are higher usually opposite the hyoid bone and originate in the primary clefts In the latter cases it would appear that



Fig 344 *a* and *b* Hygroma with ranula extension

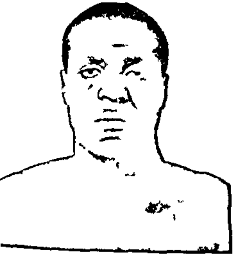


Fig 345 Pachydermatocele (see Fig 9 Scheme IV)

Fig 346 Carotid aneurysm with Horner s syndrome



347

Fig 347 Lipoma



348

Fig 348 Hodgkin s glands



Fig 340 Mixed submaxillary tumour

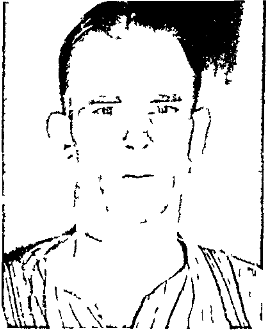


Fig 341 Branchial cyst

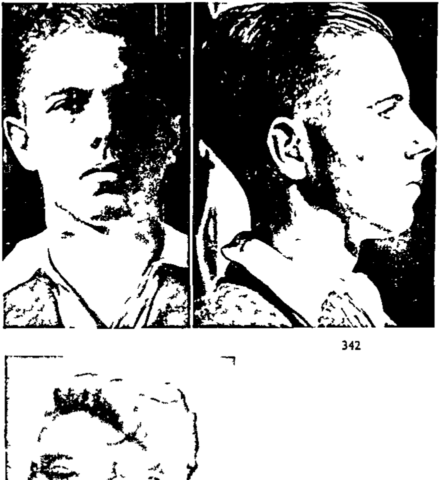


Fig 342 Tuberculous gland

342



Fig 343 External carotid aneurysm

349a



Fig 349 a and b Hygroma



349b





351



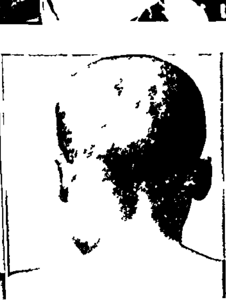


Fig 350 Lipoma (subcutaneous)

Fig 351 Subfascial lipoma

Fig 352 Neurofibroma

Fig 353 Hydatid

secondary to glands in the carotid triangle, underneath the sterno mastoid

The common enlargement is a mild septic infection from the scalp, seen especially in children with pediculosis but it is well to remember that the glands of secondary syphilis persist here for some time and, because ordinary infections are not common in them in adults their presence in a chain is regarded as strong evidence in favour of syphilis Malignant involvement of them is unlikely except from skin cancers or following other glands Otherwise there is nothing special about them This is again, a common site for a cystic hygroma, with its typical features

Lipomas are common in this region and apart from the ordinary subcutaneous one the sub fascial type usually seen in the suboccipital region is relatively common In this situation a neurofibroma may be met and may be indistinguishable clinically from the sub fascial lipoma, although it is usually considerably firmer in consistency

Other less common swellings which may be met in this triangle are (1) a fibro sarcoma of the sheath of one of the muscles e g trapezius (2) a hydatid cyst, which may be difficult to differentiate, (3) a tuber culous abscess, emanating from the cervical spine and pointing at the posterior border of the sterno mastoid, (4) a carotid aneurysm, pro jecting at the posterior border of the sterno mastoid and (5) a Baker s cyst, arising from the acromio clavicular joint and presenting four inches up the anterior border of the trapezius (Figs 348 354)

Lower Supraclavicular Triangle Lymph glands in this situation are again very commonly enlarged They form the ultimate drainage of the arm, the apex of the pleura the mediastinum and are in association with the termination of the thoracic duct on the left side They also form a secondary drainage from the rest of the glands of the neck

Apart from all the usual pathology which they may exhibit, two interesting features are met In tuberculosis of the lung apex with involvement of the parietal pleura drainage occurs into these glands with infection and enlargement and in adults they form a not infrequent entry of tubercle bacilli into the glands of the neck as opposed to the upper glands in younger patients Indeed when tuberculosis shows itself here in adults it is imperative to examine the lung apex for the primary focus Less commonly the infection comes from the mediastinal glands though more often in such cases the secondary involvement is other than tuberculosis and the glands involved are apt to be in the suprasternal fossa and so in the mid line rather than in supraclavicular fossa

The second feature is the involvement of these glands in malignant disease of the abdomen or any focus involving the thoracic duct and therefore commonly on the left side This is always a late event and

carries a hopeless inoperability with it but while the student is apt to think only in terms of a gastro intestinal carcinoma, these glands may be found enlarged in renal, prostatic, testicular or even penile carcinomas

Hygromas are common in this region both the single and multilocular cysts, and neurofibromas and fibrosarcomas are also encountered

Lipomas usually subcutaneous are also common and the bilateral, symmetrical, diffuse and somewhat painful lipomas of thyroid irregularity, known as Dercum s disease, are also met in this situation

Neurofibromata are also occasionally found here, in some cases associated with the upper part of the brachial plexus

A cervical rib not infrequently causes both a visible and palpable swelling in this area and a subclavian aneurysm may be associated with it, though it may be present apart from any accessory rib Its features are characteristic

A desmoid may rarely be met, involving one or other of the deeper muscles e g the scalenus anterior and it may be simple or malignant. It is difficult to diagnose apart from exploration and biopsy On the other hand its relation to the muscle belly, with its long diameter in the length of the muscle, and sometimes its shape conforming to that of the muscle are points which may indicate the diagnosis

Swellings of the clavicle may encroach on this triangle though they are not strictly in it. They may be due to callus, parosteal lipomata and primary or secondary neoplasms Their association with the clavicle is usually readily made out (Figs 354-360)

MUSCLES

Of the muscles of the neck the sterno mastoid is by far the commonest to be involved in pathology Apart from the involvement from extrinsic swellings, which have been considered above a number of intrinsic conditions are met which typify muscle pathology as seen by the surgeon

A haematoma is not uncommon, arising at birth by rupture of the muscle in forced labour or later by severe strain *On the other hand* one has seen it follow an intra muscular injection, though why the sterno mastoid was chosen remains a mystery It follows immediately on the injury and leaves little to doubt in the diagnosis

Abscess in the muscle is not at all uncommon, whether acute or chronic The acute abscess usually arises from pyogenic infection of a haematoma and the case is a straightforward one The chronic abscesses may be either tuberculous or syphilitic As has been mentioned, a tuberculous abscess *arising from a breaking down lymph gland,* commonly extends to the surface either at the anterior or posterior border of the muscle but it may occasionally pierce the muscle When it does this there is usually a narrow track through the muscle and no intrinsic abscess results Occasionally however the pus, on entering



354a



354b



355



356a



356b



357



358

Fig 354 Fungating sarcoma commencing in a neuro fibroma (von Recklinghausen's disease)

Fig 355 Tuberculous glands secondary to a lesion at the lung apex

Fig 356 Carotid aneurysm (a and b)

Fig 357 Plexiform neuro fibroma of the brachial plexus

Fig 358 Hygroma



a

362b

Fig 362 *a* and *b* Tuberculous abscess in the sternomastoid



Fig 363 Gumma



Fig 364 Subfascial lipoma



Fig 359 Subfascial lipoma



Fig 360 Virchow Troisier gland secondary to a carci noma of the prostate



Fig 361 Haemorrhage into the sternomastoid



Fig 369 *a* and *b* Simple adenoma of aberrant thyroid



Fig 370 Plexiform neuro-fibroma

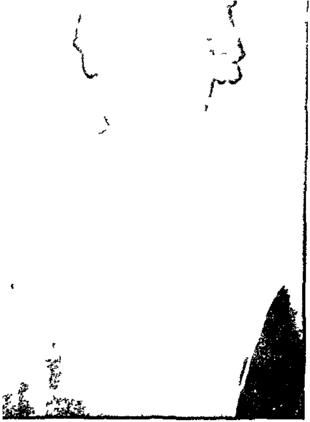


Fig 365 Hygroma involving trapezius



Fig 366 Desmoid of scalenus anterior



Fig 367 Fibro-sarcoma of trapezius sheath

368*a* 368*b*



Fig 368 *a* and *b* Aneurysm of the common carotid with secondary syphilide of fore head

the muscle sheath spreads freely up and down the inside of its belly and presents an appearance exactly like psoas abscess This is exceedingly uncommon

A gumma of the sterno mastoid is a relatively common occurrence in syphilis of some severity and restricted treatment, and is the most frequent swelling found in the muscle Whether it breaks down and forms an abscess or not usually depends on its recognition and early instituted treatment when it melts away like most other gummata

Of the tumours of the muscle two types are met The first is the fibro myxo sarcoma commencing in the muscle sheath and usually remaining superficial with very slow infiltration It might also be regarded as an extrinsic swelling It is usually of slow growth and is only locally malignant not tending to disseminate as a rule

The second is the desmoid a quaint condition sometimes reported as chronic inflammation and sometimes as sarcoma of a low grade virulence Whatever its microscopy it behaves like a locally malignant tumour and while some are cured by deep X ray therapy some are only adequately removed by very extensive excision It usually follows an injury with rupture of some portion of the fibres of the muscle It infiltrates locally and does not disseminate (Figs 361 367)

Behind the Sternomastoid Muscle Many of the swellings of the neck at all events in their early stages are not found in any of the triangles but are situated deep to the sterno mastoid between the anterior and posterior triangles Most of them have already been considered as approaching the surface either at the anterior or posterior border of the muscle

The lymph gland enlargements are by far the commonest example lying, as they do along the internal jugular vein and the carotid sheath which is under cover of the sterno mastoid All the described enlargements of these glands may be found in this situation and as the condition extends, it may actually traverse the muscle to reach the surface

The carotid body tumour occupies this position also and depending on whether it is simple or malignant it may displace the muscle and appear in front or behind it or infiltrate it and come through it Unlike the lymph glands which lie on the carotid, the carotid body tumour surrounds the vessel at its bifurcation commencing deep to it

Rarely one has met an aberrant thyroid with adenomatous formation in exactly the same position difficult to differentiate being entirely separate from the normal thyroid In two of the cases observed multiple swellings separate from each other were found a condition not usually described in the carotid body tumour

Another rare case with much of the swelling deep to the sterno mastoid though by no means limited to this situation was an extensive neurofibromatosis with multiple tumours connected to each other and involving all the structures in the neighbourhood including the muscles It proved irremovable (Figs 368 373)



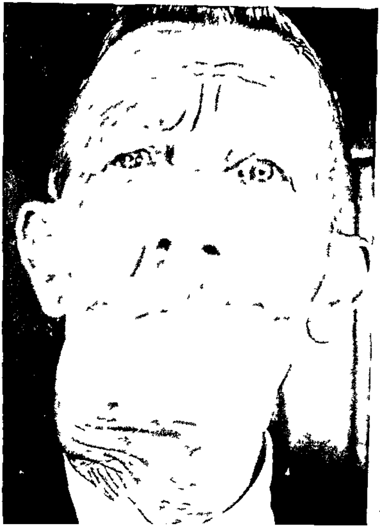
371



372a



372b



373

Fig 371 Lympho sarcoma

Fig 372 *a* and *b* Carotid body tumour malignant

Fig 373 Glands secondary to carcinoma of the pharynx

SUBJECT INDEX